MINING WORLD

in this issue

American Zinc's Mechanized Mining

Page 38

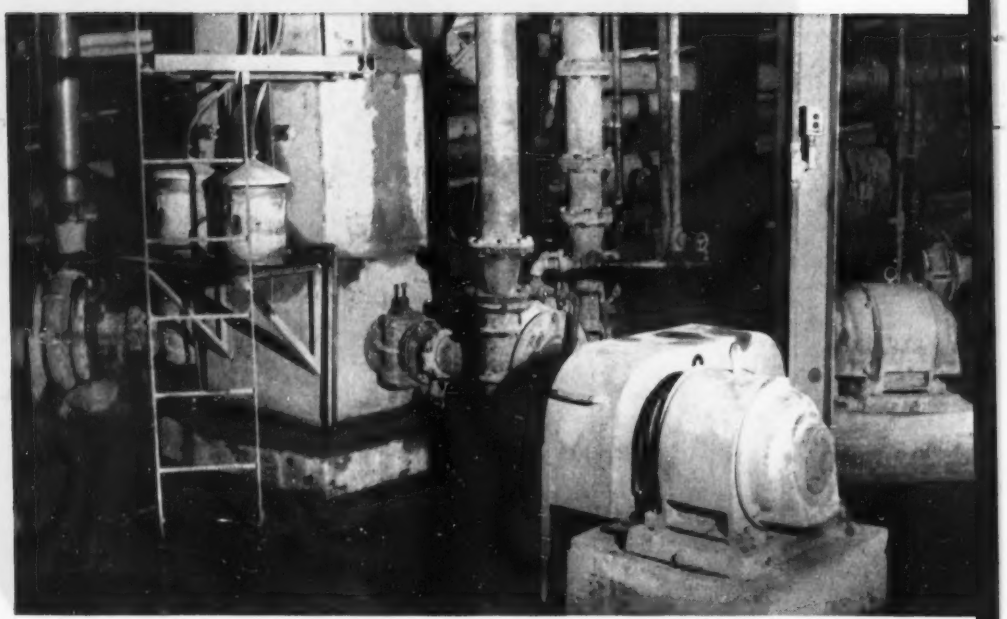
DECEMBER 1953

Vol. 15 No. 13

35 cents a copy
in sterling 3s

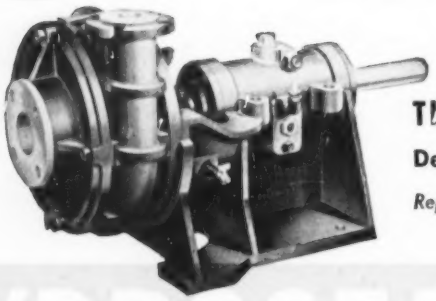
For pumping abrasives

The New Jersey Zinc Company approves HYDROSEALS



A cluster of three tailings Hydroseal Pumps and, in the right background, another Hydroseal moving slime at the Austinville, Va., mine, where 15 other Hydroseals are in use.

Besides the Hydroseal equipment at Austinville, two Hydroseals are working in series at the Empire Zinc mine in Hanover, New Mexico. Having experienced the efficiency and operating economy of these superior pumps, New Jersey Zinc has purchased Hydroseals for their new project at Friedensville, Pa. Hydroseals likely are the answer to your pumping problem, too.



Write for our new Catalog No. 953

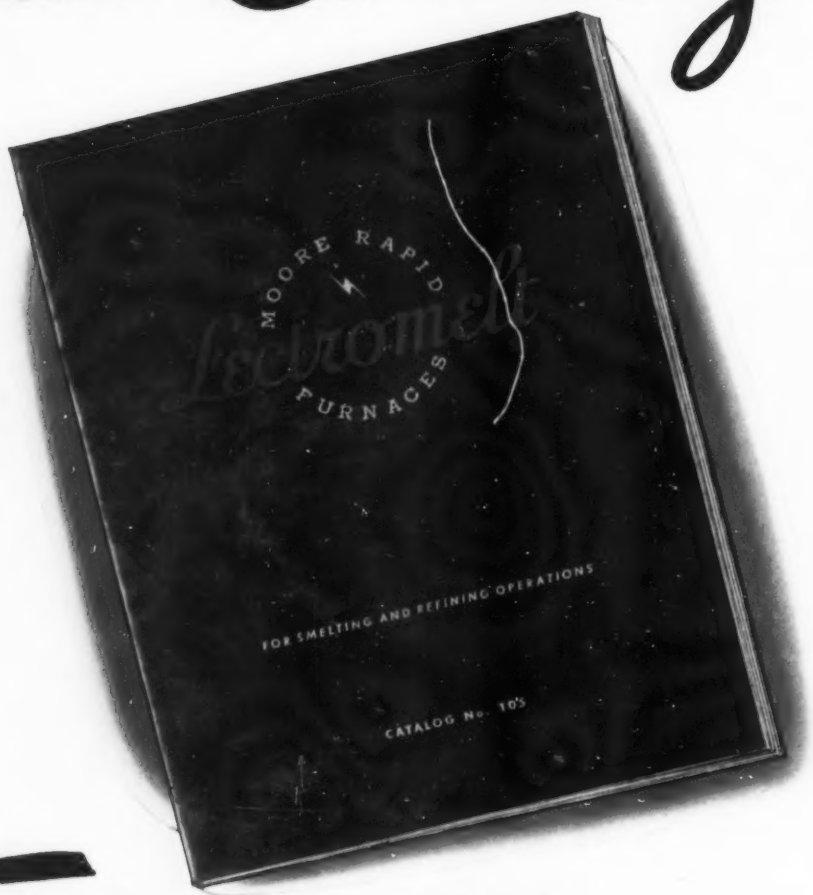
THE ALLEN-SHERMAN-HOFF PUMP CO.

Dept. J —259 E. Lancaster Ave., Wynnewood, Pa.

Representatives throughout the World

HYDROSEAL and **CENTRISEAL**
SAND, SLURRY & DREDGE PUMPS
RUBBER PROTECTED

New Catalog



Furnaces . . .

For smelting ore and concentrates of copper, nickel, iron, magnesium, cobalt, antimony, manganese, zinc, lead, tin, barium, beryllium, etc.

For production of ferroalloys, carbide, phosphorus, cast refractories, etc.

For melting of metallics and nonmetallics.

This catalog is free! Get one for your files by writing the Pittsburgh Lectromelt* Furnace Corporation, 324 32nd Street, Pittsburgh 30, Pennsylvania. Request Catalog No. 105.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

GRAB SAMPLES From the Mail

Dehydration in Sahara

Dear Sir:

I venture to ask you to supply all relevant information possible concerning the three items mentioned in your May, July, and August issues for which I attach cuttings.

In your annual Yearbook (page 139) you mention the production of cassiterite in the Massif de l'Air, Niger Francaise, as being achieved by dehydration. I would take the liberty of pointing out that production is actually by simple mining methods and the minerals recovered by dry concentration.

An average of 13 tons of cassiterite, with some tungsten, is produced per month with a daily water consumption of less than 1,000 gallons. The water consumption includes that used by a labor force of 350 to 500 Africans and six Europeans.

The concentrates assay 71 to 72 percent tin, and 65 percent WO_3, respectively. Only in the final stage is water used in their preparation for market. The mines are approximately 900 kilometers by road due north of Kano, Nigeria. The road for the most part has no justification for such appelation as it is a desert track for half the distance.

As regards the "dehydration," it is the personnel who undergo that process, it surely is dry work. The only thing you can satisfactorily cultivate is a thirst.

C. T. Sweet
Mining Consultant
Societe Miniere du Dahomey-Niger
Agadez, Niger
Africa.

MINING WORLD erred in translation from the French to English. The French " . . . est traitée par suite du manque d'eau, dans des appareils de concentration à sec." was mistakenly termed " . . . is concentrated by means of dehydration."—Ed.

Perfect Mining Summary

Dear Sir:

I have found that WORLD MINING summarizes perfectly world-wide mining news on not too bulky a scale, which in this day of accumulated files of magazines is an important consideration.

Wilson Mellen
Place d'Armes Station
Montreal, Quebec
Canada.

Remarkable Precise Coverage

Dear Sir:

We are, indeed, very much interested in WORLD MINING as we believe your coverage of world mining events is remarkably precise and up to date. Our somewhat isolated position in French West Africa makes it necessary for us to read such a publication.

P. J. Poulet
Assistant Manager
Bauxites-du-Midi
Conakry, French West Africa

MINING WORLD

***Including the Export Edition* WORLD MINING**

Published monthly except in April when publication is semi-monthly

VOLUME 15 **DECEMBER 1953** **NUMBER 13**

SAMPLE LOCATIONS

COVER CIRCLE: Flexibility in drilling at the North Friends Station mine is shown in the cover circle. One drill at lower left is putting in a lifter while the other drill on the Joy Drillmobile is spotted for a back hole.

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EDITORIAL AND EXECUTIVE OFFICES

121 Second St. **San Francisco 5, Calif.** **GArfield 1-5887**

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ABP

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High Production and Lower Maintenance—

You Get BOTH with "Eucs"

Built for tough off-the-highway service, Rear-Dump Euclids have increased production and reduced hauling costs on scores of open pit mining and quarry operations. Ability to deliver "plus" performance year in and year out has made "Eucs" the accepted standard for comparison . . . here are some of the reasons why:

RUGGED SIMPLICITY

Designed and built for long life and low maintenance cost. All of Euclid's experience and facilities are devoted to specialized off-the-highway earth moving equipment.

CAPACITY

Euclids have payload capacities of 10, 15, 22, 34 and 50 tons. Because they are matched to various sizes of loading and crushing equipment, "Eucs" provide a well balanced operation for open pit haulage and increase the efficiency of the loading unit.

POWER AND SPEED

Powered by diesel engines of 125 to 600 h.p. "Eucs" have top speeds with full payload, up to 36 m.p.h. Five and ten speed transmission, or torque converter with semi-automatic transmission available. The favorable ratio of horsepower to payload means more pay tons hauled every trip.

VERSATILITY

"Eucs" are efficient for moving any material on any length of haul; handle overburden, rock, coal, ore and other materials loaded by shovels, draglines, transfer hoppers and mobile loading equipment.

If you are interested in higher production at lower cost, have your nearby Euclid Distributor show you what "Eucs" are doing on work similar to yours. He'll be glad to make a hauling cost estimate for your job—no obligation, of course.

The EUCLID ROAD MACHINERY Co.

SUBSIDIARY OF GENERAL MOTORS CORPORATION

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Euclid Equipment

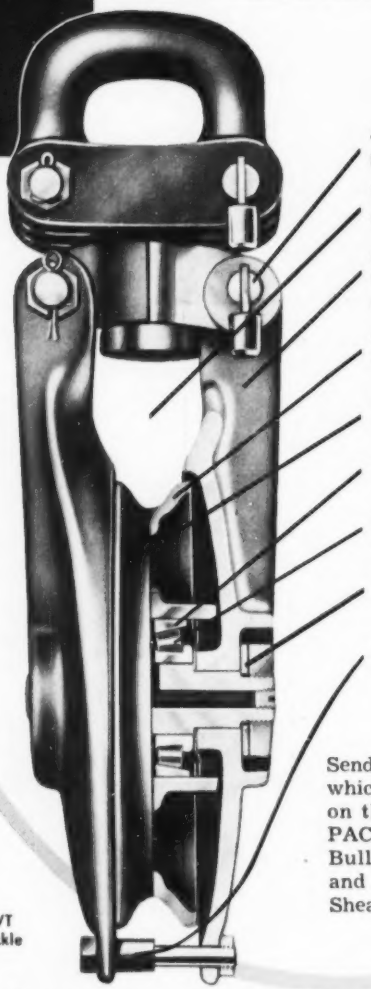
FOR MOVING EARTH, ROCK, COAL AND ORE

YOU GET MORE FOR YOUR MONEY in PACIFIC SHEAVE BLOCKS

★

TYPES AND SIZES TO SUIT EVERY MINING OPERATION

Read the pull-out captions on this cutaway view and you'll see why PACIFIC Quick-Opening Sheave Blocks offer you more for your money. Manganese steel sheaves, manganese steel side frames—work-harden for longer wear. Sheaves are kind to cable. Side plates stand up. Upkeep is nil. Load rated roller bearings for extra safety. Special grease seals. Send for Bulletin No. 238.



All blocks equipped with chained toggle pin for quick-opening.

Wide throat passes fittings, splices or square knots.

Manganese steel side frames work-harden with use. Practically impossible for cable to cut through.

Sheave rims are recessed into side frames to prevent rope fouling.

Manganese steel sheaves work-harden with use. This reduces cable wear.

Special grease seal keeps out foreign material, keeps grease in.

Roller bearings are load-rated with extra high safety factor.

Shaft and bearings assembled with positive shake-proof lock washers.

Spacer is integral part of side frame. Won't collapse against sheave, even if spacer bolt is lost.

Model CF with Hook

Model CF with Shackle

Model C with Safety Swivel Shackle

Model 6WT with Shackle

Send for Bulletin No. 238 which gives specifications on the complete line of PACIFIC Sheave Blocks. Bulletin also illustrates and describes PACIFIC Sheave Anchors.

Model C (half shroud) and Model CF (full shroud) furnished in 8", 10" and 12" sizes. Available with hook, shackle or safety swivel shackle. ★ Pacific 6WT Wide Throat Carrying Block available with shackle or hook. Toggle pins included as standard equipment. ★ ALLOY also manufactures 19" Tail Block Assemblies and 6" Standard General Utility Blocks (not illustrated).

ALLOY STEEL & METALS CO.

1848 EAST 55TH STREET, LOS ANGELES 58, CALIFORNIA

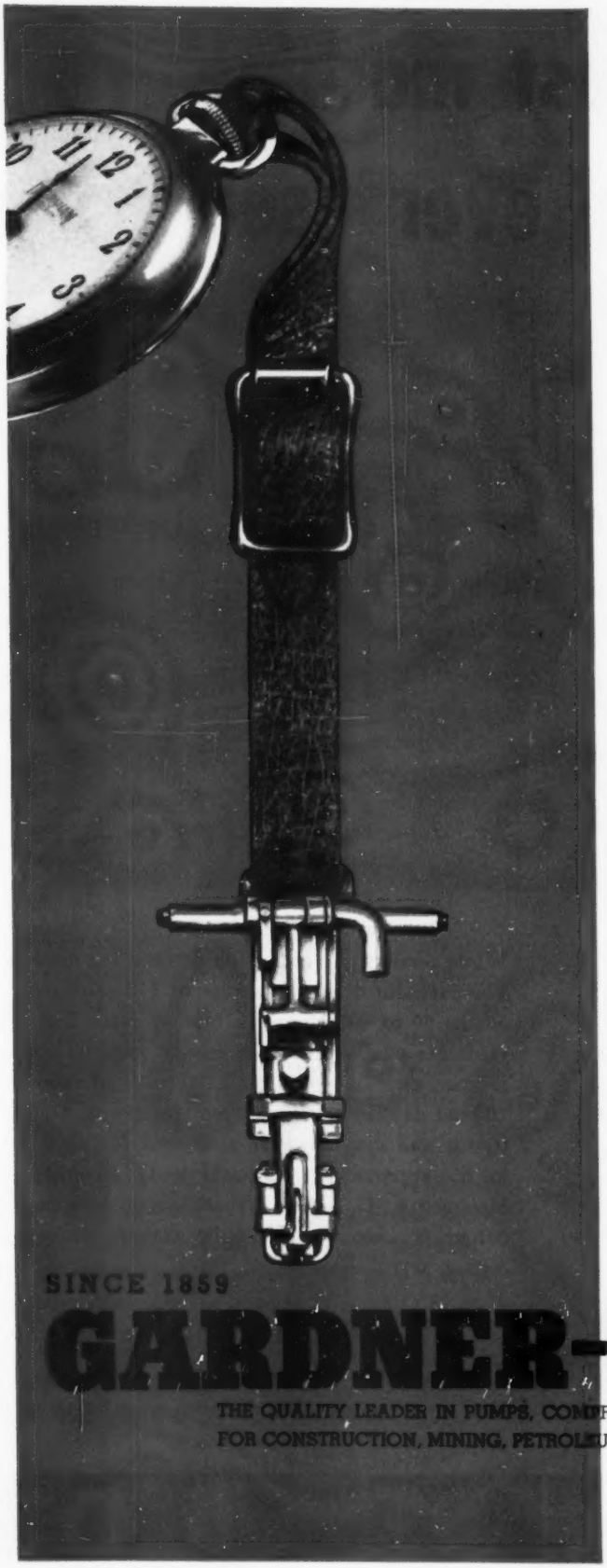
Mailing address:

Box 15323 Vernon Station, Los Angeles 58, Calif.

Be specific — Order PACIFIC

Jaw Crushers, "Slushmaster" Scrapers, Round-the-Corner Sheave Blocks, Bit Knockers and Wearing Parts.

ALLOY STEEL & METALS CO.



mark of the HARD ROCK MINER

For many years, this handsome Gardner-Denver watch fob has been presented to miners.

In mines throughout the world, it has become the symbol of the "hard-rock man"—and a token of the esteem in which he holds Gardner-Denver equipment.

Gardner-Denver Company
Quincy, Illinois

SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

"By far the best machine we've ever used"

Feeding wet sand,
Tournatractor earns high praise
for moving 1720 yds. daily,
yet requiring little maintenance

American Sand & Gravel Co., Hattiesburg, Mississippi, use their 186 hp Tournatractor for a variety of tasks at their Glendale pit. Its chief job is to doze filler sand 25 to 200 ft. to within reach of a clamshell which loads trucks and railroad cars for delivery to road jobs around the state.

While production depends on demand for material, Tournatractor dozes an average of 172 yards hourly on the 50 to 400 ft. cycles. Moving from 2 to 2½ yards per pass, it brings in enough material for 47 railroad cars . . . or about 1720 yards of sand per 10-hour day! In about 1000 working hours, Tournatractor and dragline have accounted for 4500 carloads (approximately 225,000 tons) according to Manager A. G. Collins. That's about 4 times the output possible with a 76 hp crawler doing the dozing, says Collins.

Builds roads, strips land

Easily handling normal feeding requirements by itself, the versatile Tournatractor uses its 19 mph

186 hp Tournatractor dozes moist abrasive sand to within reach of clamshell. As needed, it moves onto tracks to position rail cars. Tires prevent damage to ties and tracks.

Note excellent condition of tires after 2900 hours operation in sand. Their big size, plus 4-wheel drive, gives plenty of flotation and traction in the soft, loose footing.

speed on rubber to good advantage on scattered odd jobs, too. It spots railroad cars for loading . . . in spare time, has leveled 14,000 yds. for a truck road and railroad spur line, and has stripped 8 acres of timberland for development of a gravel pit.

90% efficient over 2900 hours

American Sand & Gravel Co. reports Tournatractor 90% mechanically efficient for 2900 hours. Repairs and adjustments have been negligible . . . tire wear *excellent* despite the abrasive material. Tournatractor has eliminated all track and roller maintenance, and has required only a few minor repairs in 1½ years of steady use.

Says Supt. H. E. Golden, "For this job, Tournatractor is by far the best machine we have ever used. Because a dozer is often needed on another job frequently a mile away, its speed is an important factor in keeping our operation running smooth."

Adds Operator Pat Riels, "I like the operating features of Tournatractor. You can put in a full day's work and still feel good at the end of the day. Besides, you don't spend half your time waiting around between jobs."

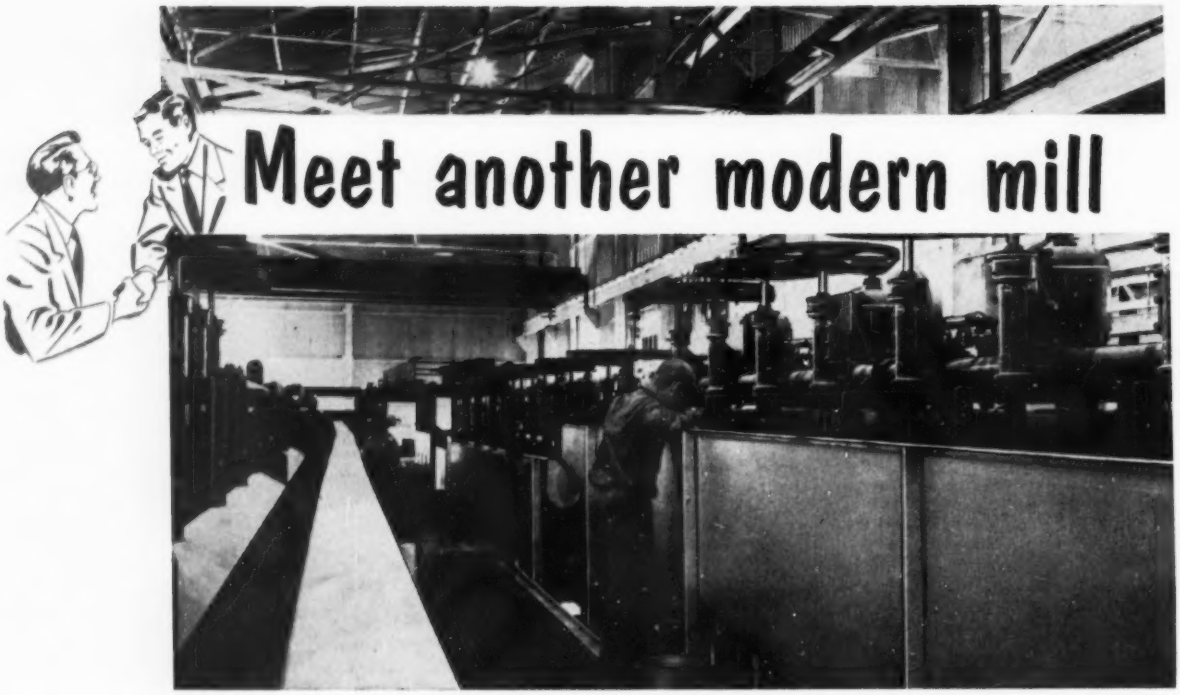
Find out for yourself how Tournatractor's go-anywhere mobility and 19 mph speeds can get more work done for you at lowest-net-cost. Contact your LeTourneau-Westinghouse Distributor for a demonstration on *your* job. There's no obligation.

Ahead of schedule at clamshell, Tournatractor strips timberland for development of gravel pit. 19 mph speeds and "go-anywhere" mobility enable it to economically handle dozens of scattered assignments.

Tournatractor—Trademark T-279-S

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS



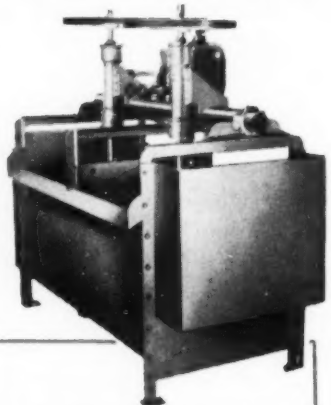
Meet another modern mill

Streamlined with AGITAIR®

Ore concentration in this modern mill is exclusively Agitair Flotation. The units are all 36" and the total mill capacity is 1500 tons . . . a streamlined copper operation in one of the great metal regions of the West.

Success here depends on both efficient metallurgy and low production costs. Agitair fits the formula both ways. This rugged machine, with great flexibility of control, yields economies right down the line — in maintenance, reagent consumption, wear and tear on mechanism and rubber parts.

For identified case histories involving metallurgical problems that concern you, write us today.



Our free Bulletin No. 4A is a graphic and comprehensive description of Agitair Flotation. Write for copy today.

Leaders in Experience & Service

THE GALIGHER CO.

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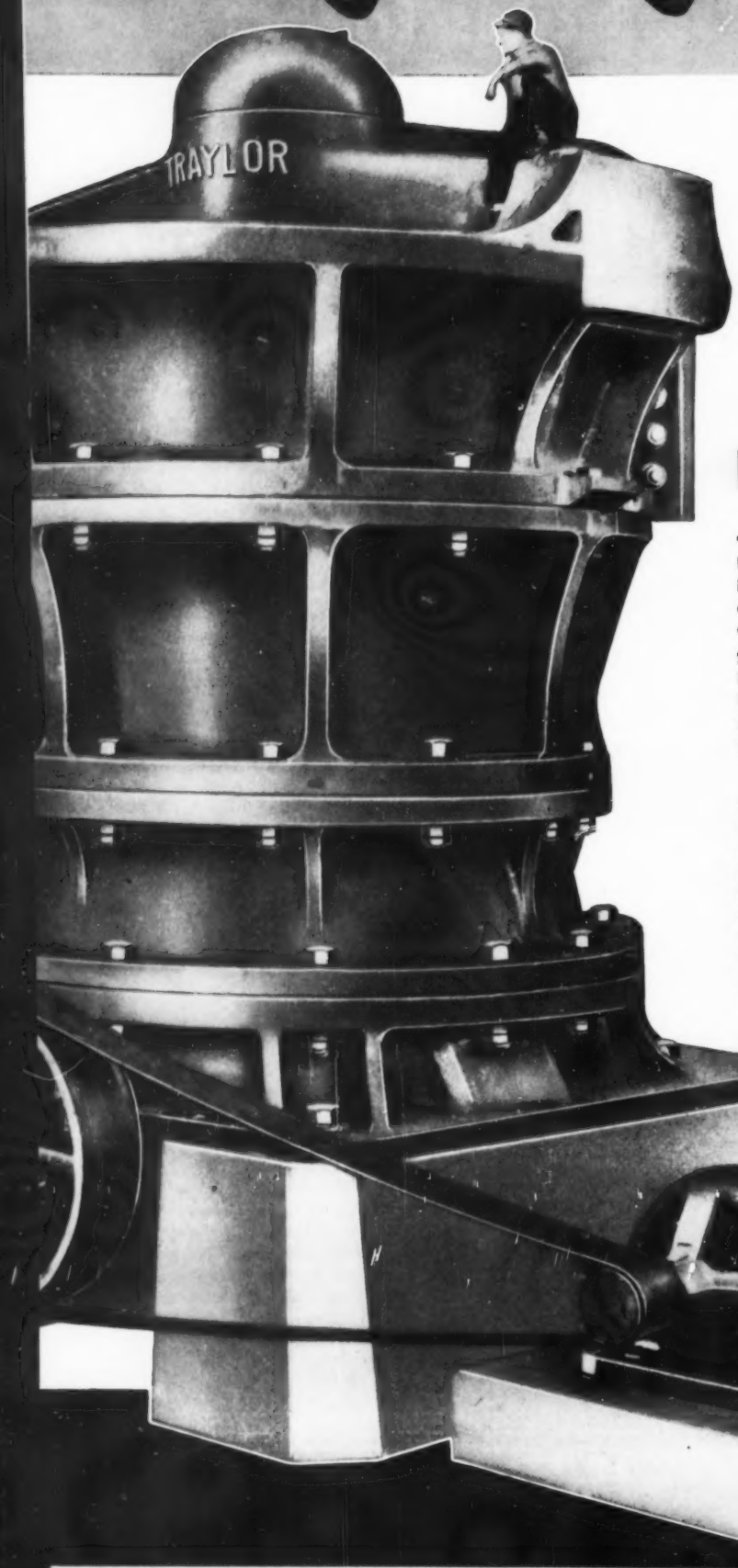
Agents In All Principal Foreign Mining Districts

BIG Gyratory Crushers



THE 6th 60" GYRATORY BUILT BY TRAYLOR

"Traylored" to produce 30,000 tons per day, the latest of Traylor's super-size 60" Gyratory Crushers is on its way to the famous copper mine at Chuquicamata, Chile. This crusher is equipped with Traylor's original curved concaves and bell head.

Some idea of the weight of this gigantic machine can be judged from the relatively small eyebolt used to lift the shaft. It weighs over half a ton. The cast steel frame of the crusher is over 5" thick at several points.

Traylor built the first successful 60" Gyratory in 1919 . . . 34 years ago. It proved that a gigantic crusher with high hourly capacity could effect amazing production economies. This first 60" was sold to a Michigan limestone producer. Because of its outstanding efficiency, this same customer purchased their second 60" Traylor Gyratory four years later. Of these 60" crushers, three are in Michigan, one in Arizona, one in England and one in Chile. Capacities up to 3500 tons per hour.

A Traylor LEADS TO GREATER PROFITS

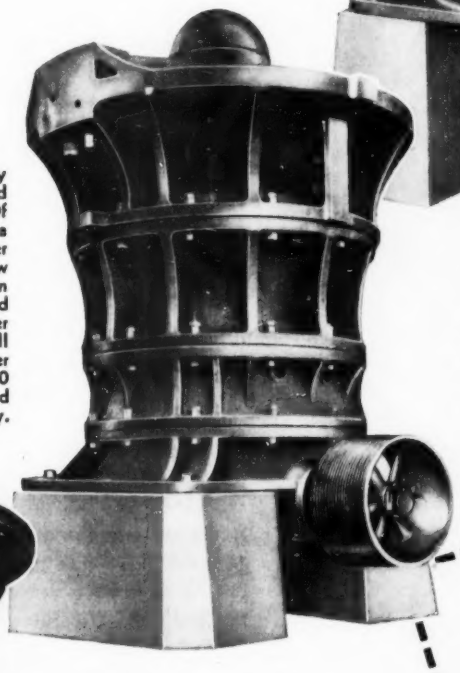
Since 1919

are "Traylor-MADE"

Result: Traylor has acquired special skills and facilities for building these big machines.

With 38 of these huge Gyratory Crushers in the field, Traylor design and construction have been proved under a wide range of operating conditions. To match this accumulated "know-how," Traylor has expanded facilities to build these big crushers with precision and efficiency. Consequently, the producer who needs 645 to 3500 tons hourly production will find the Traylor TC a crusher of unusual operating economy and dependability. Write concerning your requirements. Let us show why it pays in the long run to buy a Gyratory "Traylored" to your individual needs.

FOUR 48" Traylor Gyratory Crushers have been built and TWO are in the works. Of those in the field, one is in a Pennsylvania ore mine, another is crushing trap rock in New Jersey, still another is in Minnesota on iron ore and the fourth in Nevada on copper ore. The two in the works will be crushing iron ore and copper ore. Capacities up to 1980 tons per hour are obtained with the 48" Traylor Gyratory.



EIGHT 54" Traylor Gyratory Crushers are in the field, four in Canada, one in England, one in Mexico, one in Michigan and one in Nevada. These crushers are used to help produce cement, nickel, copper and iron. The Traylor 54" Gyratory has hourly capacities from 1400 to 2240 tons.

EIGHTEEN 42" Traylor Gyratory Crushers are in a wide range of service. One is in Chile, two in Canada and the rest dispersed over 14 different states. The 42" Traylor Gyratory provides capacities up to 1290 tons per hour.

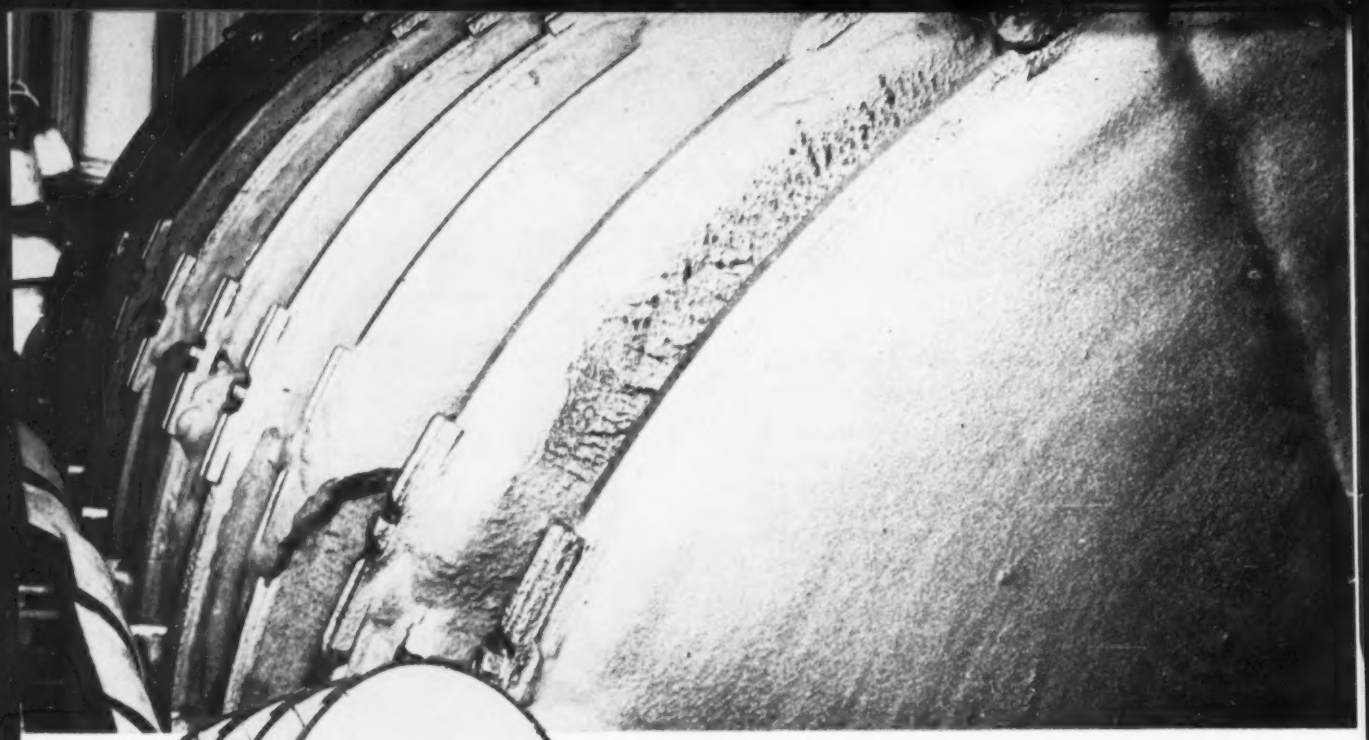
FOR MORE INFORMATION
mail this coupon today to . . .
TRAYLOR ENGINEERING & MANUFACTURING CO.
1603 MILL ST., ALLENTOWN, PA.

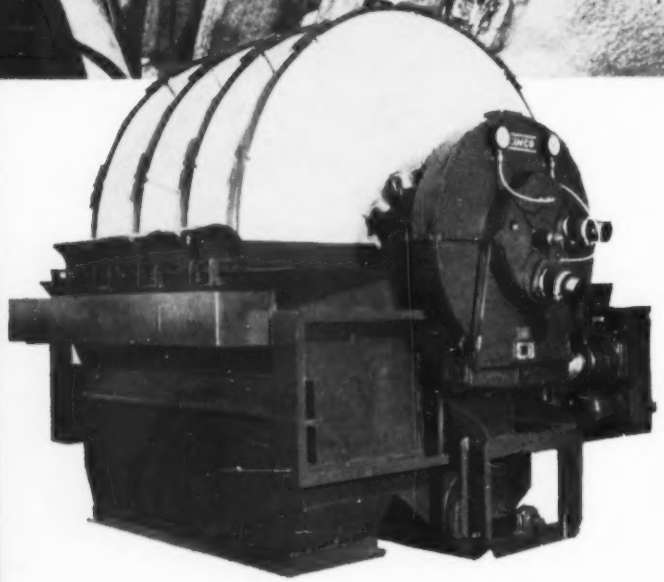
Send me complete facts about the Traylor TC Gyratory.

Name: _____
Position: _____
Company: _____ State: _____
Address: _____

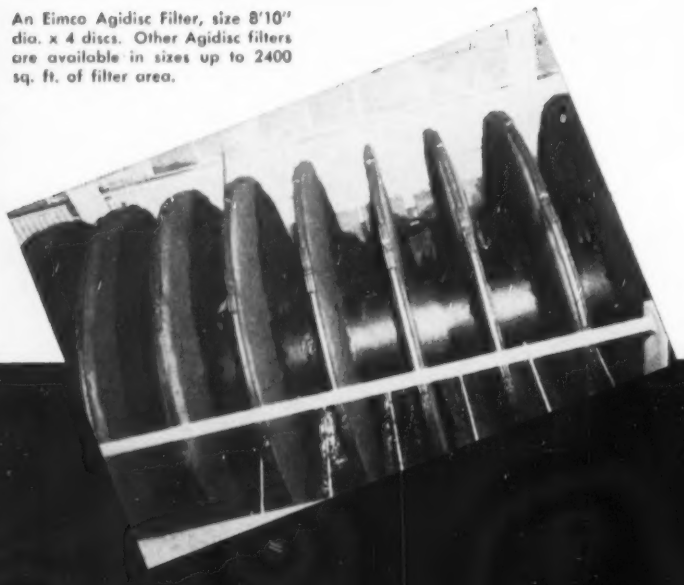
Sales Offices: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

Traylor has built 38 of the world's biggest crushers





An Eimco Agidisc Filter, size 8'10" dia. x 4 discs. Other Agidisc filters are available in sizes up to 2400 sq. ft. of filter area.



Eimco Agidisc Filters for Metallurgical Plants

Step up production in the mill by using more effective Eimco Agidisc filters in the dewatering of metallurgical slurries.

Eimco filters are carefully designed, heavy-duty production filters. In actual operation these units will produce more cake with lower moisture content than any other filter on the market of their type and size. Eimco Agidisc filters will also reduce your filter bag costs.

Here are some typical comparative results—In one plant an Eimco Agidisc filter was installed next to an ordinary disc filter, both operating at the same time on the same feed. The concentrate dewatered on the Agidisc contained 1½%-2% less moisture and tonnage dewatered on the Eimco Agidisc was 20% greater than on the ordinary disc filter.

EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

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IDEAS at work...cutting costs!

P&H

Progress doesn't come by standing still! And many users of P&H Electric Shovels have learned (to their great benefit) of the strides made to cut costs in all kinds of open pit work.

How has P&H done it? Higher electrical efficiency results from equipment designed and built by P&H specifically for electric digging. Stepless power regulation gives smoother operation with none of the old contactor troubles. P&H Magnetorque* Hoist Drive gives you snappier dipper action—lasts the life of the machine. Air-filtered cab protects all electrical equipment. Independent propel permits faster move-ups. All-welded construction of rolled alloy steels provides the husky strength to withstand years of continuous shock loads.

These and many other advancements, still exclusive with P&H, mean steadier, faster digging. That, in the final analysis, means lower tonnage costs. If that's what you're looking for . . . P&H is your answer.

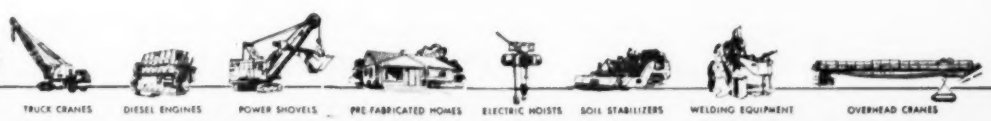
**T. M. of Harnischfeger Corporation for electro-magnetic type coupling.*

P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

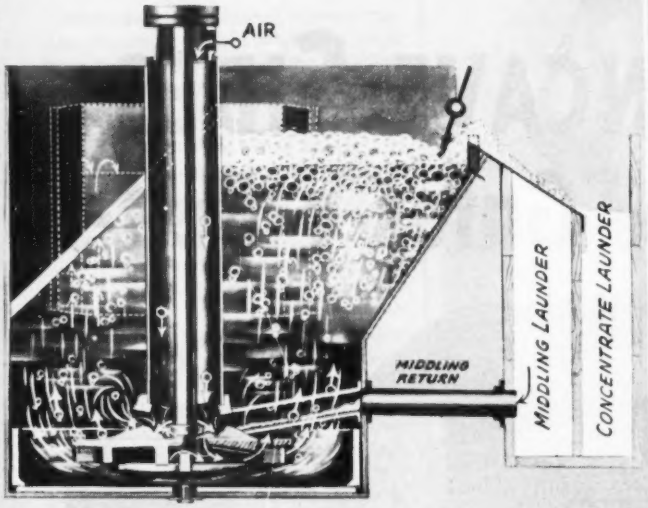
the **P&H** *Line*



TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PRE-FABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

DENVER "SUB-A" FLOTATION

Complete Milling Equipment – from testing, to feeder, to dryer!



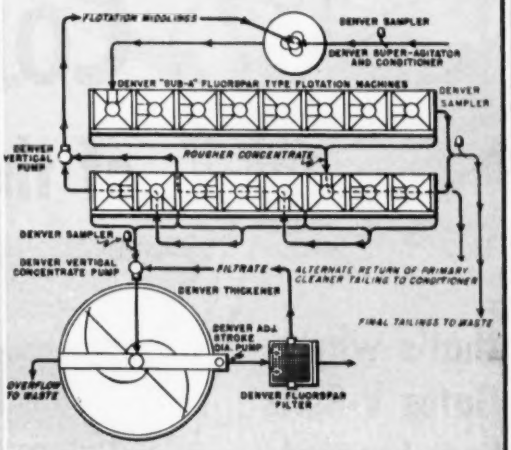


Photo at left shows cut-way view of Denver "Sub-A" Flotation Cell. Note how feed pipe enters at low level discharging on to impeller. Flowsheet at right illustrates flexibility in returning froth products for additional cleaning without use of pumps or step-downs. Note complete control of cleaner-cell tailings as they are recirculated.

Exclusive Principle of Denver "Sub-A" Flotation Permits Gravity Return of Middlings and Froth Without Pumps or Step-Downs

Clean, high grade concentrates and much lower costs are made possible by Denver "Sub-A" Flotation Machines. With cells all on one level, you can return concentrates to cleaner cells by **gravity flow**, and recirculate cleaner tailings. This completely eliminates expensive pumps and step-downs. Only Denver "Sub-A" Flotation offers these exclusive features. Positive recirculation — without "short circuiting" — gives you lower tailing and highest grade concentrates.

GRAVITY RETURN

The high original costs and maintenance of pumping or stepped down cells are unnecessary when you use Denver "Sub-A" Flotation. This is because the feed pipe is located near the bottom of each Cell—directly over the impeller. Since the location of this feed pipe is low, it is a simple matter to return middling froth by gravity down a launder into a cleaner cell six to eight cells away. The low level of the feed pipe also makes it possible to recirculate tailings from cell to cell— without pumps.

Thus, in Denver "Sub-A" Flotation Machines, cell-to-cell gravity flow and cell-to-cell middlings return is easy. You thereby eliminate pumps and step downs...and get better metallurgy...and have the flexibility you need to meet changing conditions.

HIGHER GRADE CONCENTRATES

Another important feature in all Denver "Sub-A" Machines which allows you to get higher values is the positive circulation feature. Positive circulation means that all material entering a Denver "Sub-A" Cell must enter through the feed pipe directly over the impeller. Thus any feed, middling return, froth return or coarse sand product gets maximum exposure to flotation treatment. As a result, Denver "Sub-A" Flotation gives you lower tailings and higher grade concentrate.

Write or wire—find out about the many other advantages of Denver "Sub-A" Flotation which help you get greatest profits with lowest costs.

Free Technical Bulletin Sent on Request

Over 25 years of Flotation Engineering

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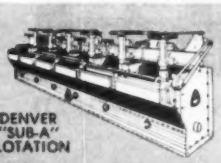
DENVER "SUB-A" FLOTATION


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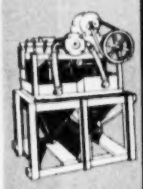

DENVER MINERAL JIG


DENVER VERTICAL PUMP


DENVER SRL PUMP


DENVER AUTOMATIC SAMPLER


DENVER STEEL HEAD ROD MILL


DENVER ORE FEEDER

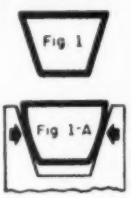
Notice the CONCAVE SIDES (U.S. PATENT NO. 1813698) of the Gates V-Belt-

. . . that's why Gates V-Belts Last Longer!

Look at this!

In *half a minute* you can prove for yourself the belt-saving advantage of the CONCAVE SIDES.

Take any *straight-sided* V-Belt (Fig. 1) and bend it as it bends in going around its pulley. At the same time, grip its sides with your fingers and *feel* those sides *bulge out* as in Fig. 1-A.

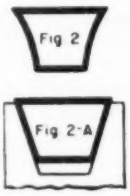


Clearly, those bulging sides will press *unevenly* against the V-pulley—and this causes extra wear at the points shown by the arrows (Fig 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

As the belt bends, grip its sides—and you will feel the precisely engineered CONCAVE SIDES *fill out* to an *exact fit* in the sheave groove (Fig. 2-A).

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means *longer* belt life and *lower* belt costs for you!



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES— The Gates Vulco Rope.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-537

V-Belts — Hose Molded Rubber Goods for Industry World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

Shovel-Crane Performance Depends a Lot on the Crawler

The crawler on a shovel, crane, dragline, clamshell, or hoe contributes much more to the operation of the machine than just transportation. It is important in many ways to over-all performance.

In the first place, the actual size of the crawler should be related to the type of job being performed. For example, a shovel that operates on firm footing with limited travel, such as in a quarry, can function properly with medium crawler length and tread width. The same shovel moving frequently on soft ground would need wider treads and a longer crawler to give lower ground bearing pressures and consequently better soft-ground flotation.

STANDARD

Dragline and crane work generally require the longest and widest crawlers with the widest treads of all. Working with a long boom at a low angle tends to make the front end of any machine "nose-in", particularly when on soft ground. An extra-long crawler with wide treads to give more "footing" and lower ground pressures can reduce this considerably.

LONG

Extra-long, extra-wide crawlers are sometimes used on draglines and more often on lifting cranes to give additional stability and thus, increased lifting capacities.

Crawlers that can travel in either direction and have 4-way tread-travel locks operated by power from the cab are more efficient and safer. These allow the machine to travel forward or "move-up" into the job as necessary; whereas, any rearward thrusts, due to digging action of the machine, work against locked treads to hold the crawler in position. It also eliminates backsliding on uphill work or travel.

LONG-WIDE

Crawlers that can be steered with the turntable in any position of swing save time on the job — and if all crawler controls are operated from the turntable cab, greater and faster maneuverability is obtained.

The crawler can make the difference between profit and loss on a job. Get the right one to fit your needs.

From Cyanamid Research

New Chemicals for Thickening and Filtration

AEROFLOC* REAGENTS

now in commercial use in plants concentrating precious metal, base-metal and non-metallic ores and coal

for

Speeding-up and Effecting More Complete Settling;
Conserving Values Previously Lost to Thickener Overflow

Increasing Filter Capacity • Reducing Moisture in Filter Cake

These new Cyanamid Reagents flocculate fine particles into larger clusters thereby accelerating settling rates in thickeners or changing filter cake characteristics to increase filtration rates.

AEROFLOC* Reagents and their applications have been extensively investigated in Cyanamid Mineral Dressing Laboratory on metallic and non-metallic ores, including sulfide concentrates, flotation and cyanidation tailings, slimy gold and iron ores, coal, etc., etc. They are now in successful use in plants treating Copper, Zinc, Manganese, Molybdenum, Tungsten, Gold, Fluorspar, Coal and many other minerals. Typical results in mill operation include:

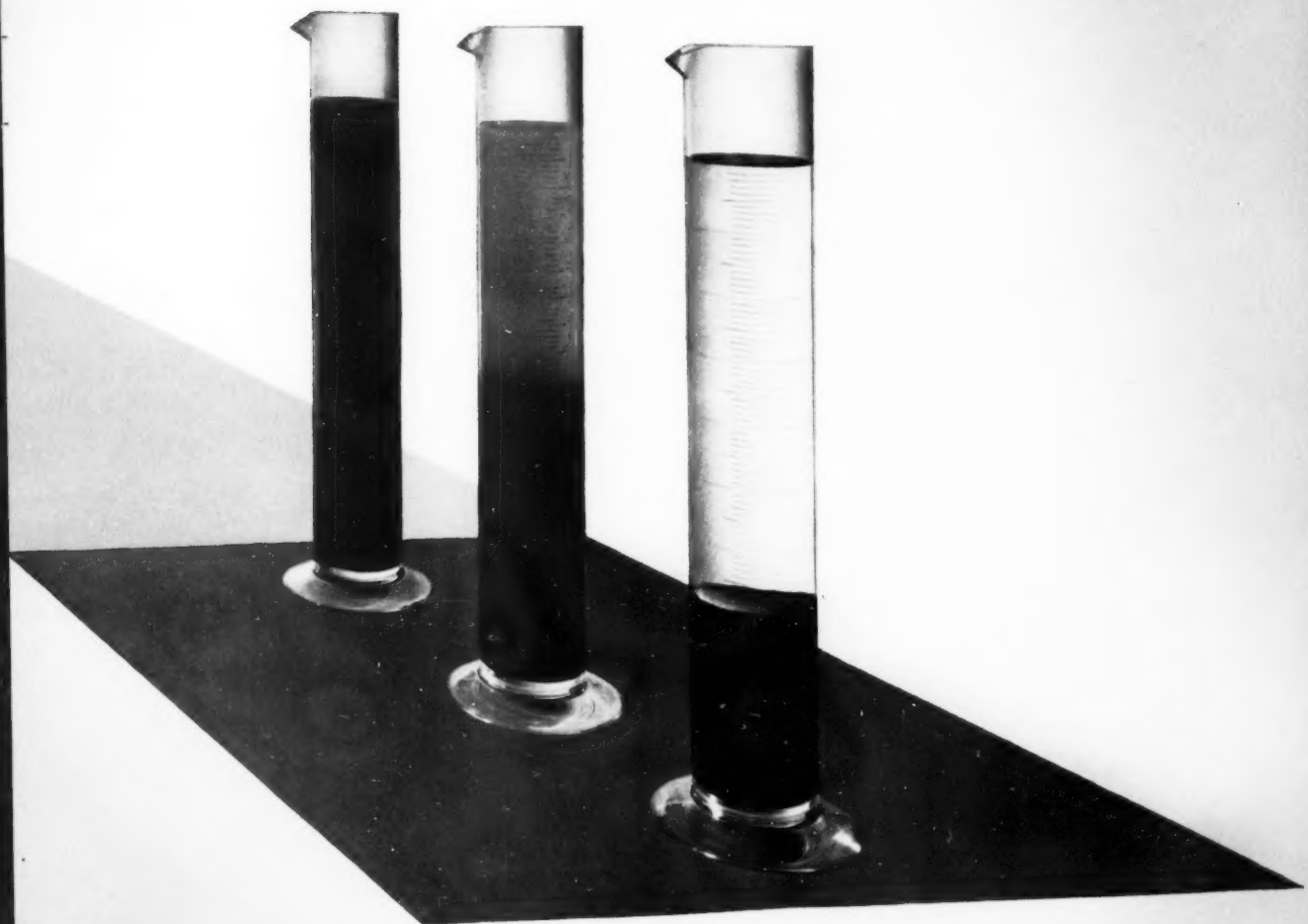
APPLICATION	QUANTITY	RESULT
Clarify Effluent from Coal Preparation Plant	0.013 lb. AEROFLOC 548 per 1000 gal. effluent	Thickener overflow reduced from 0.15% to 0.005% solids . . . clear enough to discharge into stream.
Thickening Non-sulfide Pulp	0.04 lb. AEROFLOC 552 per ton of dry solids	Loss of values in thickener overflow has been cut to less than 1% of that formerly lost.
Thickening Cyanide Pulp in CCD Plant	0.01 lb. AEROFLOC 548 per ton of dry solids	300% increase in settling rate; clear overflow.
Thickening Pulp in Non-Metallic Mill	0.03 lb. AEROFLOC 548 per 1000 gal. feed to thickener	Reduced solids content in thickener overflow from 0.025% to 0.006%. Present thickener now handles increased mill-tonnage.

*TRADE MARK

FOR FILTRATION—AEROFLOC* REAGENTS can

1. Increase filtration rates, make filter cakes firmer and more porous, help to prevent blinding of filter cloth and increase washing ease and efficiency.
2. Reduce capital expenditure by increasing capacity of filters.
3. Produce tailings for backfill that have a higher percolation rate, with the result that they settle faster and more firmly.

Often when filtering pulps thickened with AEROFLOC* Reagents these advantages accrue without further addition of AEROFLOC.



Several grades and types of AEROFLOC Reagents are currently available. Cyanamid Field Engineers are familiar with commercial results obtained with these reagents on a variety of ores in many mining fields. They will be happy to work with you on possible uses in your mill, to provide samples for mill-laboratory tests, and to arrange for delivery of quantities sufficient for your mill tests.

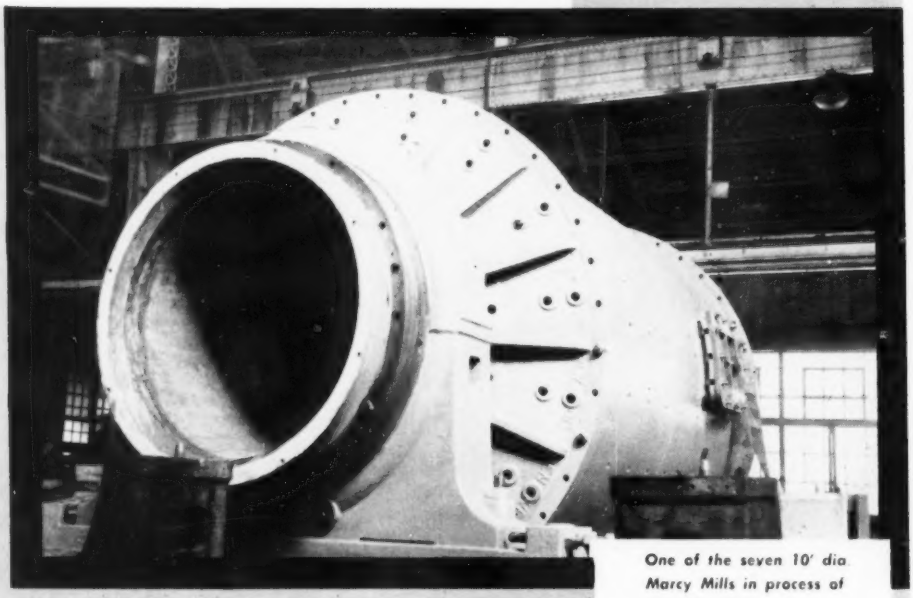
A letter or telephone call to the nearest Cyanamid Field Engineer or Cyanamid Office will get prompt and intelligent attention.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK

MARCY MILL PERFORMANCE PROVED ON *TACONITE*, TOO!



One of the seven 10' dia. Marcy Mills in process of manufacture.

8 MARCYS OPERATING ON THE IRON RANGE

The advantages of the Marcy principle of grinding—low pulp line and rapid circulation of mill content, through use of a grate discharge—have been proved by the wide acceptance with successful mining companies throughout the world.

On the Iron Range, for example, there are 8 Marcys—1, 9'x12' rod mill; 1, 10'x10' ball mill; 3, 10'x12' rod mills; 3, 10'x14' ball mills.

The Mine & Smelter Supply Co.

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REPRESENTATIVES IN FOREIGN COUNTRIES

● *You, too, can have the advantage of this proved performance....*

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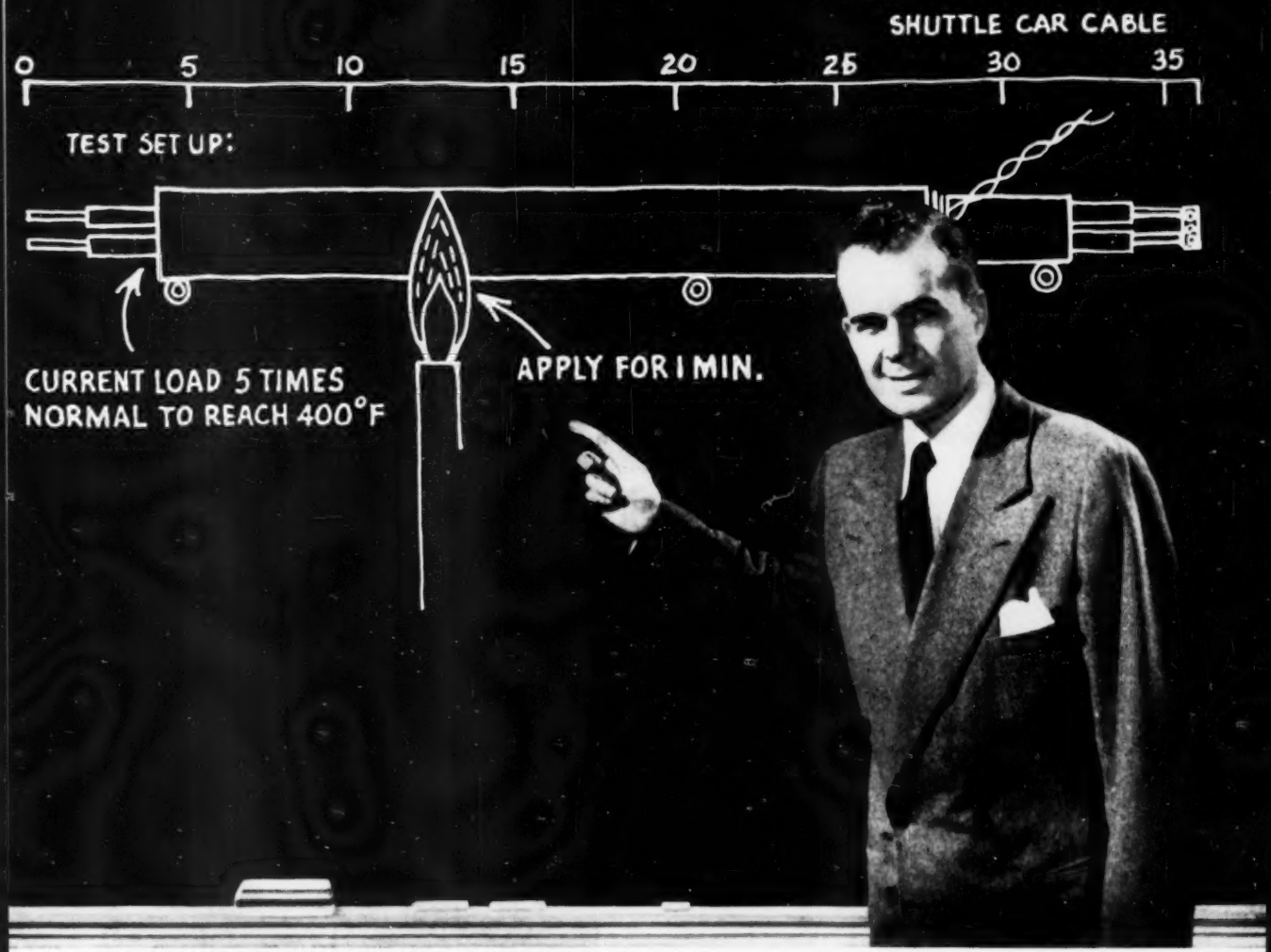


APPROVED USBM TEST: Cable fails if it burns more than 6 inches or flames more than 3 minutes.

NO ANACONDA CABLE EVER FAILED THIS TEST

The U.S. Bureau of Mines flame-test for trailing cables is tough. But ANACONDA Cables have passed every time...*with ease*. That's not all! Performance-wise, a recent survey of shuttle cars in 15 mines found ANACONDA Cables last up to 300% longer than cables used only a few years ago.

NEW FEATURES GIVE CABLE STAMINA

These facts are as good a certificate of quality as any we know. As new features have been added to ANACONDA Shuttle Car Cables, each has been repeatedly tested on special, scientifically designed equipment. A new improved neoprene jacket is tougher, more flame-resistant. You'll find more strength and heat-resistance in the new cold-rubber insulation. The cable has also been stranded in a new and decidedly better way. No wonder it can take more abuse from overloads, compression-cutting, sliver-cuts in wet mines, rib-pinching, runovers and dragging. Patented breaker strip* and balanced tensile strength of ground and power conductors make it safer to use.

A CLOSE LOOK AT CABLE COSTS

Examine this cable yourself. Ask your Anaconda Sales Office or Distributor for a sample. Test it . . . tear it apart. Then look at the cost of *one* shutdown on any working face of your mine caused by *one* break in cheap cable. It far exceeds any possible saving from buying cable on price. Your own production figures soon prove the value of quality cable. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.* *U. S. Patent No. 2,455,773

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

FLAT-TWIN CABLES FOR:
shuttle cars
continuous miners
loaders
cutters
drill trucks

HI-VOLT CABLES FOR:
mine power

TYPE SH-D FOR:
shovels

TYPE SO FOR:
hand drills
remote control

TROLLEY WIRE
FEEDER CABLES
TELEPHONE WIRE
SHOT FIRE CORD
WELDING CABLES

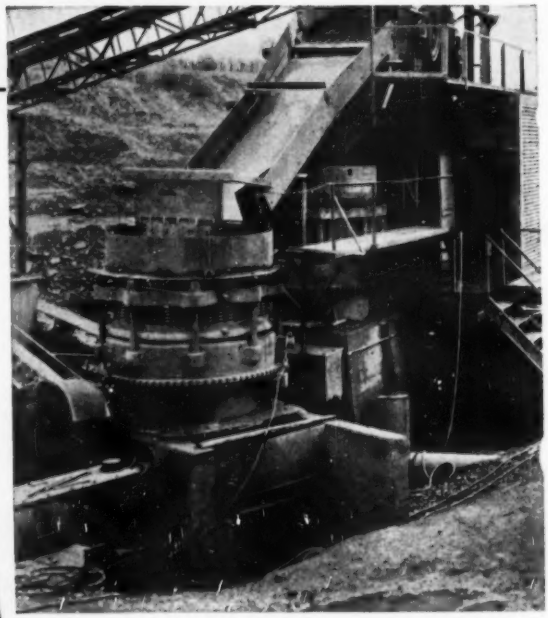
At Mary Ellen Mine—heavy media plant in building at left; conveyor on right delivers ore from crushing plant in pit *(see picture below)* where Telsmith Gyraspheres do fine crushing.

crushing

BANDED TACONITE with

TELSMITH *Gyraspheres*

ON THE MESABI IRON RANGE



● On the Mesabi Iron Range of Minnesota, the Stanley Mining Co., Biwabik, Minn., is mining and treating banded taconite. Here their Mary Ellen Mine has two Telsmith Gyraspheres (shown at the right) which have, for the past two years, been doing a right good job of fine crushing for the mill feed. Plus 2-in. material passes to one No. 48 Telsmith Gyrasphere, with coarse crushing concave bowl, set at 1-in., and in closed circuit with a screen. Minus 2-in. plus ¾-in. oversize from the screen's bottom deck passes to a second No. 48 Telsmith fine concave Gyrasphere, set at ⅝-in., and thence to the beneficiation plant.

The *new* Telsmith heavier design Gyraspheres have a longer crushing stroke for greater capacity and a finer, more uniform product and new mechanical features for lower up-keep and longer life, resulting in lower crushing cost per ton.

Min-32

Get New Bulletin 274

describing all the new design and mechanical improvements of Style S Standard and Style FC Fine Crushing Gyraspheres.

SMITH ENGINEERING WORKS, 4034 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Mine & Smelter Supply Co., Denver 17, Colo. — Fouiger Eqpt. Co., Salt Lake City, Utah — Mines Eng. & Equip. Co., San Francisco 4, Calif. — Robert S. Bailey, 816 W. 5th St., Los Angeles 17, Calif.

Lee Redman Equip. Co., Phoenix, Arizona — Starline Equipment Co., Boise, Idaho — General Machinery Co., Spokane 1, Wash. — Clyde Equipment Co., Portland 9, Ore. Seattle 4, Wash. — Gordon Russell, Ltd., Vancouver, B. C.

ACTUAL SIZE

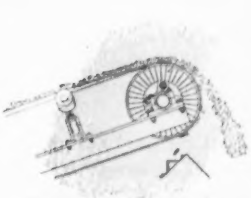
DUMB-BELL?...

. . . NO,

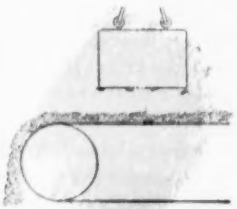
it's a big 8-inch hunk of iron that found its way into a crusher. Its scarred surface tells a sad story about that crusher and its unhappy owners who learned how economical an investment a magnet can be . . . the hard way.

Preparation plants that don't magnetically protect their crushers, belts and other equipment ought to compare the cost of tramp iron trouble with that of adequate magnetic protection.

And if your old magnets aren't doing the job, learn about the new, improved types available. *Write Dings today for* CATALOG C-5000-B.



Dings Magnetic pulley installed as head drive pulley on conveyor belt. Iron separated, discharged automatically.



Dings Rectangular Suspended Magnets pull iron out of deepest burdens, fastest moving conveyor belts.

RS153

Dings

MAGNETIC SEPARATOR COMPANY

4719 W. Electric Ave., Milwaukee 46, Wisconsin

Magnetic Separation Leader for over Fifty Years

SLUGGING IT OUT TO LABRADOR IRON

Reliability and ruggedness are vital here. These two Caterpillar DW10 Tractors with No. 15 Scrapers are far out in the Canadian woods, at Mile 142 of the Iron Ore Co. of Canada's railroad from Quebec to the rich Ungava iron ore deposits in Labrador.

Below-zero temperatures, a 20-hour work day, and extremely difficult terrain make this one of the world's toughest tests of equipment. There are about 195 Caterpillar units, almost two-thirds of the total equipment, on this $200,000,000 job!

Because of an 8" frost overlay, the Cat* Scrapers must be shovel-loaded by the Caterpillar-powered P&H crane in the illustration. The mixed sand, silt, and equipment-busting boulders is hauled 1½ miles to fill another part of the right-of-way.

These Caterpillar DW10s can highball at speeds up to 24.5 m.p.h. for fast and low-cost production. The companion No. 15 Scraper hauls a heaped load of 12.5 cu. yd. With its sharp turning ability, stability in rough going, and excellent operator visibility both front and rear, the combination of Cat DW10 and No. 15 Scraper is a "natural" for mining work of many kinds. Like all Caterpillar Engines, the DW10's has fast, positive starting, and delivers full power on money-saving No. 2 furnace oil.

Call your Caterpillar Dealer for an on-the-job demonstration of this fast-hauling team. And count on him for prompt, skilled service and genuine Caterpillar parts.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

—Drifts and Crosscuts—

1953 In Review—As the year 1953 draws to a rapid close, the editors of MINING WORLD have reviewed the many and varied developments in the minerals industries during the year. The editors believe that the following events had greatest significance, reader interest, and world-wide importance.

Trend of year: was the continuing decline in lead and zinc prices with the resultant forced closings of many United States mines.

The most significant *exploration trend* was the deeper development and long-range costly explorations in Idaho's Coeur d' Alenes.

Discovery of the year was the Bathurst, New Brunswick zinc-lead district where millions of tons of mill-grade sulphides were developed by extensive surface diamond drilling. Second most important discovery was uranium found by a prospector almost in the geographic center of Wyoming.

Mine of the year was the Mi Vida of the Utex Exploration Company south of Moab, Utah. Well over $1,000,000 worth of uranium ore averaging about 0.50 percent U_3O_8 was shipped during the year. Ore reserves are probably valued in the tens of millions of dollars. The Climax mine of the Climax Molybdenum Company of Climax, Colorado was runner up as production was increased to 22,000 tons per day and 27,000 tons was planned to make it the second largest underground mine in the world.

Mill of the year honors went to the Barvue Mines Ltd. which treated over 5,200 tons of open pit zinc-lead ore per day at its Barraute, Quebec plant.

Mining developments of the year were the expansion of rotary drilling of large-diameter blast holes in open-pit mining. Underground mining was the scene of constantly increasing Dieselization and mechanization which made it possible for many zinc-lead mines to stay in operation in the era of low metal prices.

The new Burwell filter can be considered the *metallurgical development* of the year. Specially designed for rapid filtering of fine sticky materials, it should find wide use in uranium and tungsten processing. The use of cyclones as classifiers in closed circuit regrinding of zinc concentrate in the United States, and gold in South Africa was another important metallurgical development. The application of ion exchange in the byproduct uranium plants of South Africa was the *metallurgical process development* of the year.

In the field of *exploration drilling* increased use of dry air-cooled rotary drills and bentonitic mud stabilization of unconsolidated materials were most important.

Geological findings were topped by the increasing number of very important uranium deposits found on the Colorado Plateau in older sediments than the Morrison (Jurassil) which has long been the most important host formation. This has expanded ore possibilities many times as there are literally thousands of cubic miles of sedimentaries in which uranium can and does occur in contrast to the earlier belief of a rather restrictive stratographic localization.

The record of *accomplishment in mining* was the sinking of the 26-foot 5-inch-diameter shaft by the Vlakfontein Gold Mining Company, Ltd. 585 feet in May. A "cactus" type grab helped set the record at the No. 2 shaft near Springs, Union of South Africa.

The *most important mining article* of the year was "The Sydvaranger Story" in the October issue of MINING WORLD which completely described the world's first commercial taconite operation—that of A/S Sydvaranger at Kirkenes, Norway.

The *surprises of the year* were the strength of the copper market, and the increase (about 11 percent) in the production of tin from Bolivia's nationalized mines. The first event was aided by the gradual liquidation of British Ministry of Supply stocks and off-the-market Chilean government accumulation of Chilean production seeking an outlet at high prices in the last quarter. In regard to Bolivian tin it must be remembered that production costs of over $1.00 per pound contrasted with the world price of about $0.80 in the last six months.

Things to watch in 1954 will be the increasing scale of geological activity and new mine development in the Mascot-Jefferson City, Tennessee zinc district. The new discoveries and increasing uranium ore reserves in the Grants-Laguna district of New Mexico. Also the tremendous expansion of phosphate mining and elemental phosphate production in southern Idaho, western Wyoming, and northern Utah.

The miners' hope of 1954 is a free market for domestically mined gold and the right of citizens to buy, own, and sell gold.

No 3-D—No, there won't be any three-dimensional pictures in MINING WORLD. A remarkable series of 3-D pictures were taken in Norway for the Sydvaranger Issue (October 1953) and readers have requested their publication. Sorry but the United States Post Office Department has ruled that the individual polarized glasses, of necessity, stapled to the page would constitute merchandise and the entire magazine would be parcel post rather than the regular second class mail. Anyhow, the Editors tried to keep you abreast of the latest in photographic and printing techniques. Reader interest has been at an all-time high for the issue so we will continue to present the best old-fashioned pictures and technical reporting.

Index In This Issue—Once again the annual index of published material in MINING WORLD for 1953 appears on page 100. This is always a part of the December issue, bound right into the book. You don't have to wait several months for a separate pamphlet index or write a letter requesting such an index as is the case with some other mining publications. Readers say that another advantage of the integral index in December is that they can have the year's issues bound immediately with the index included and always in the same place.

CAPITOL CONCENTRATES

FRAUDULENT CLAIM HEARINGS PLANNED BY LAND BUREAU

According to Lewis E. Hoffman, chief of the Interior Department's Minerals Division, Bureau of Land Management, plans are being formulated to expedite and simplify the procedure for declaring fraudulent mining claims null and void. The proposal under consideration calls for the creation of the position of hearing's examiner, duly certified by the Civil Service Commission, to represent the director of the Bureau of Land Management in the field.

The method to be used would be "in the nature of a judicial proceeding," Hoffman stated, "with the right of the examiner to rule on evidence and render a quick decision on the record. The evidence will be considered impartially and fairly by a party who in no way had anything to do with the examination of the mining claim, who is not subordinated to any local office or region, but who has complete freedom and independence of decision."

The right of the mineral claimant to appeal the examiner's decision would be preserved, Hoffman added.

• *Not A Mining Man On It*

The President has appointed a four-member cabinet committee to develop a minerals policy for the United States and to make recommendations prior to next March 31. It is unfortunate that not one of the four cabinet members even claims to have any knowledge of the domestic mining industry and its problems.

President Eisenhower called for a new mining program which would protect domestic mine expansion and assure the nation enough minerals for the "uncertain years ahead." The idea is good and there is a real demand and need for such a policy, but we have our fingers crossed on what will come from this committee.

The President appointed Secretary of Interior Douglas McKay chairman of the committee and designated Secretary of State John Foster Dulles, Secretary of Commerce Sinclair Weeks and ODM Director Arthur Flemming as the other members. He wrote Secretary McKay that "the depressed conditions within numerous metal mining districts" are "a matter of grave national concern."

The President added that "the mining industry has contributed in large measure to our present state of preparedness through the vigorous expansion of its facilities. Every effort should be made to preserve this new added economic strength through policies that would be consistent with our other national and international policies."

The deadline for the report of the committee to the President is the same as the report on the lead and zinc industry which is being prepared by the Tariff Commission.

Here's hoping that we will get something definite, instead of a lot of meaningless words, that will tell us we can actually progress toward national security which requires a healthy and going domestic mining industry. We have been traveling in the other direction for a long while. Domestic mining needs a clearly defined federal mining policy.

• *Gradual Reduction in Copper Stockpile Planned*

The British Ministry of Materials has announced completion of arrangements to dispose of about 60,000 long tons of government-owned copper over a period ranging from a few months to more than a year. It now appears that the British government will be left with between 150,000 and 200,000 tons of copper, most of which will be retained for its strategic stockpile.
the copper market a firmer tone.

When free trading in copper was resumed on the seems to have allayed these fears somewhat and given London market, fears were expressed that Britain might dump its huge stocks of surplus copper on the market at one time. The spread-out recently announced

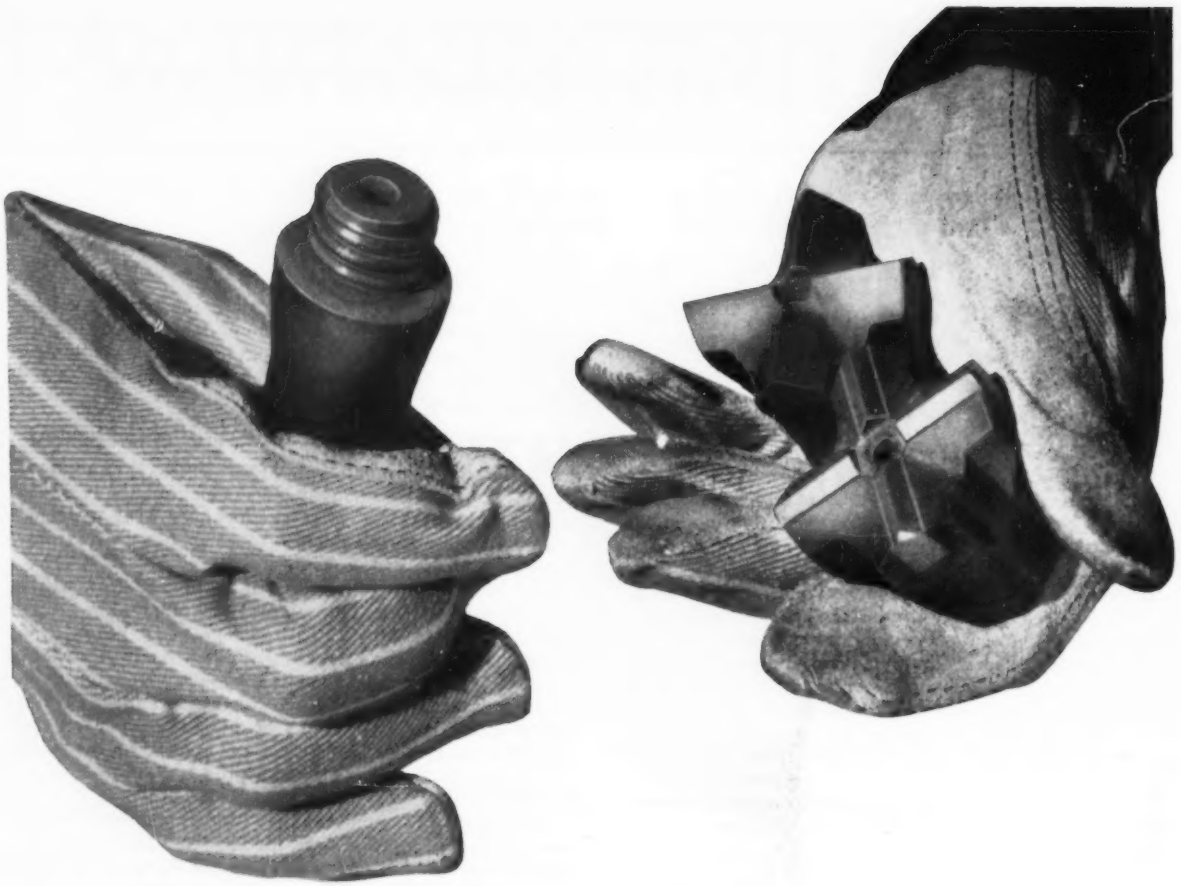
• *Sliding-Scale Quotas Merit Study*

It seems quite evident that the Administration is committed to oppose high tariffs. The testimony by cabinet officers and others against the Simpson flexible or sliding-scale tariff bill, and the pressure put on the Congress by the White House to defeat it, is sufficient indication of the trend. Such a bill might be passed by a strong marshalling of high-tariff forces in the Congress, but it is almost certain that a White House veto would be the outcome.

The suggestion has been made that the same results as were expected of the Simpson bill might be gained by another device, one which could be called a sliding-scale quota. At some point where supply and demand cause prices to drop to a level where production for the majority of domestic mines is no longer profitable, imports could be curtailed to some predetermined figure which, causing shortages, would raise the domestic price. As the price advanced, additional metal would be allowed to enter the country until a balance was obtained at a reasonable market figure.

Such a device might also make the opposition of importers less active. As foreign metal would take the same price as domestic metal, foreign producers might prefer to import 100,000 tons at 17 cents and make a real profit rather than 400,000 at 10 cents and barely scrape by.

This concept is not a new one, as it has been applied to other products. Because of the psychological effect of not being called a tariff, a sliding-scale quota bill might not be actively opposed by the Administration, even though approval could not be given. Through a careful study of supply and demand figures it should not be too difficult to determine at what prices certain tonnages would be permitted to enter the country. Of course, a provision should be included in the bill whereby the President could suspend the quota system in time of war.



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Dozens of different Timken® carbide insert and multi-use bits fit the same drill steel

With Timken® interchangeable rock bits, it only takes a minute to unscrew one rock bit and screw on a different type bit right on the job—whenever the ground changes. Because dozens of different Timken carbide insert and multi-use bits fit the same steel, your men don't waste drilling time by going after a different set of drill steels every time a different type bit is needed.

You can cut your drill steel inventory. And you can save even more money because your drillers always can use the most economical bit for the job.

Both Timken carbide insert and multi-use bits give you two additional advantages: 1) they're made from electric furnace Timken fine alloy steel, 2) they have a special shoulder union pioneered by Timken that keeps the drilling impact from damaging threads.

Our rock bit engineers may be able to help you with your drilling problems. They're experts at cutting drilling costs. Why not let them analyze your operations. There's no obligation. Just write to: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.

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Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small diameter holes, very deep holes.

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TRADE-MARK REG. U. S. PAT. OFF.

Senator Malone's subcommittee which is studying the plight of the domestic lead and zinc miners might well give the sliding-scale quota idea some study and come up with a bill. The reaction to a simple bill, setting up import quotas for lead and zinc (and, perhaps, copper), uncomplicated by other devices, would be interesting to watch.

• *New Procedure For Loans Announced*

Loans under the Defense Production Act (formerly made by the RFC on certification by DMPA, now a section of EPS) will now be made by the Treasury Department on certification by the Office of Defense Mobilization, according to a recent executive order.

• *Farm Bureau Opposes Buy-American Act*

One of the latest and staunchest opponents of the Buy-American Act is the American Farm Bureau Federation. It claims that "most Americans are agreed" that to continue pouring U.S. cash aid through MSA to foreign countries would put too great a strain on the country's economy; that some way will have to be found to enable recipient countries to earn dollars with which to buy American goods. This is one of the same old round of arguments pro and con low and high tariffs, since the Buy-American Act, if realistically applied by the government, would act very much like a high tariff in excluding foreign goods. Actually the act has so many loopholes that it is more honored in the breach than the observance. All these opinions in the long run depend upon whose ox is being gored. Why not just cut MSA aid and keep the Buy-American Act? This plan would suit a lot of people also.

• *Bureau of Land Management Is Next*

A six-man survey team has started a study of the Department of Interior's Bureau of Land Management. Its report is to be submitted about December 20.

The group, appointed by Interior Secretary McKay, is composed of the following: Floyd Hart, president and general manager of Timber Products Company, Medford, Oregon, chairman: Philip D. MacBride of Seattle, Washington; Paul Hunt, well known Salt Lake City mine official; and three officials of the Interior Department, namely, Robert Efteland, Robert Coot, and Theodore Taylor.

COMING CONVENTIONS

December 1, 1953. Annual Meeting AMERICAN MINING CONGRESS, 6:00 PM University Club, New York, New York.

December 2 to 4, 1953. MIDCENTURY CONFERENCE ON RESOURCES FOR THE FUTURE, Washington, D. C.

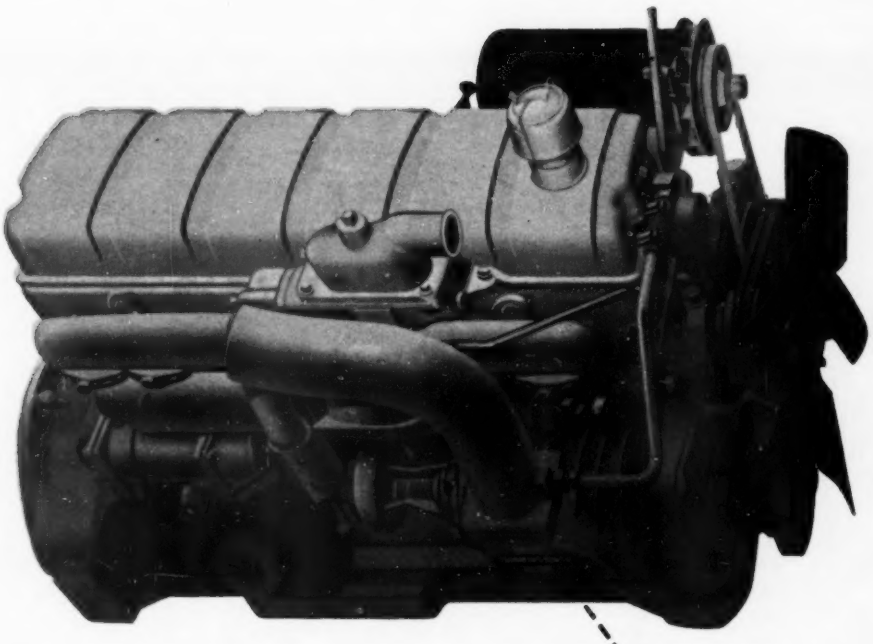
December 4 and 5, 1953. NORTHWEST MINING ASSOCIATION, Davenport Hotel, Spokane, Washington.

January 11, 12, and 13th, 1954. Annual MINNESOTA SYMPOSIUM ON MINING, Duluth, Minnesota.

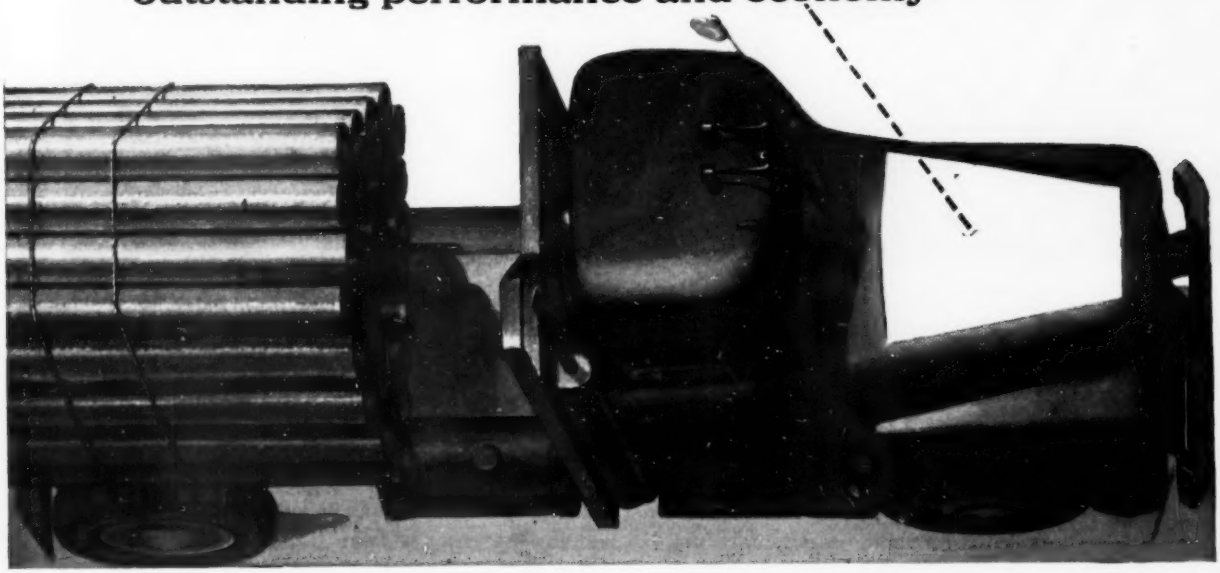
January 26 and 27, 1954. SCINTILLATION COUNTER SYMPOSIUM, Statler Hotel, Washington, D. C.

January 28, 29, and 30, 1954. Annual meeting of the COLORADO MINING ASSOCIATION. Shirley Savoy Hotel, Denver, Colorado.

February 15 through 18, 1954. Annual Meeting AMERICAN INSTITUTE OF MINING ENGINEERS, mining branch at Statler Hotel and metals branch at Hotel McAlpin, New York, New York.



outstanding performance and economy



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BOISE: Cummins Diesel of Idaho, Inc.

PHOENIX: Cummins & Moran
Authorized Sales & Service: YUMA—Cooper Tractor Service; LAS VEGAS—Stirling Diesel Service.

SALT LAKE CITY: Cummins Intermountain Diesel Sales Co.
Authorized Sales & Service: CEDAR CITY—Wally's Chevron Truck Service; IDAHO FALLS—Automotive Body and Machine, Inc.; ROCK SPRINGS—Jim Macy's Blue Bell Service.

(10-7-53)

MAKE WATER RUN UPHILL with ANHYDREX CABLES

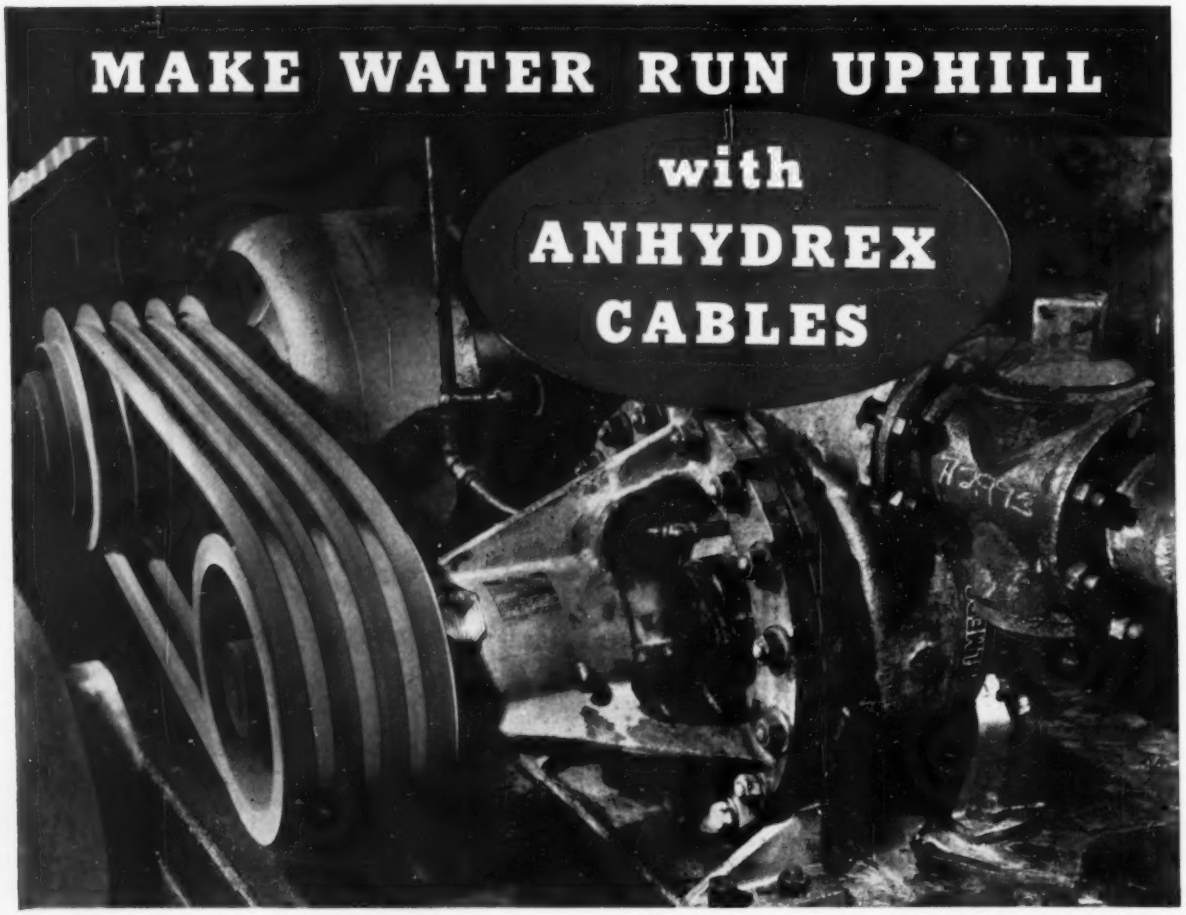

Photo courtesy ALLIS CHALMERS MFG. CO.

Getting rid of unwanted mine water is not something that can be put off until tomorrow. Frequently it must be done today — or else.

Continuous operations, such as pumping, should not be left to haphazard selection of "just any kind of cable." For service as important as this, only the highest grade cable should be installed. Penny-pinching is definitely not economy. All it does is increase your cost of operation.

Ask yourself how much it would cost if a cable failed and put a pump out of operation. When you think that way it should be obvious that ANHYDREX is the cable you should buy and install.

The conductors of Simplex-ANHYDREX Cables are insulated with a low water-absorptive rubber insulation. They are protected by a generous wall of a special neoprene jacket. That is a combination that can't be beat.

The next time you need a cable for pumping service, regardless of the difficulties involved, install a Simplex-ANHYDREX Cable. It will pay you large dividends in peace of mind and in long-time operation.

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SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Massachusetts

NABABEEP, SOUTH AFRICA—The O'okiep Copper Company, a Newmont Mining Corporation subsidiary, has started shaft sinking at its Nababeep West ore body following extensive exploration drilling.

SUDBURY, ONTARIO—Falconbridge Nickel Mines Ltd. has started its $11,500,000 program to bring the Fecunis Lake ore body into production. The No. 1 six-compartment shaft is to be sunk 3,950 feet. First production is scheduled in 1958.

JOHANNESBURG, UNION OF SOUTH AFRICA—The Doornfontein Gold Mining Company Ltd. is the latest South African gold producer to sign a contract with the Atomic Energy Board of South Africa to produce uranium.

CHRISTMAS, ARIZONA—The Riveria Mines Company has signed a contract with the GSA to produce and deliver 3,000,000 pounds of copper to the government from the Christmas mine at 32.00 cents per pound in the next two years.

RIO de JANIERO, BRAZIL—Companhia Niquel Tocantins has plans for production of 4,500,000 pounds of nickel per year from its Niquelândia deposit in Minas Gerais State.

PORT PIRIE, SOUTH AUSTRALIA—The Australian government's uranium recovery plant is being enlarged. Initial operation is scheduled for the first half of 1954.

GRANTS PASS, OREGON—Waite Minerals, Inc. has contracted to ship 30,000 tons of copper concentrate and ores to Japan from its Queen of Bronze mine in the next two years.

LEAD, SOUTH DAKOTA—Homestake Mining Company, the largest and deepest United States gold mine, has started to deepen its Yates shaft from the 4,250-foot level to 5,000 feet. Plans call for sinking of a new large underground shaft below the 5,000-foot depth.

LANDER, WYOMING—An important discovery of the uranium mineral—carnotite—has been made by a prospector in eastern Fremont County, Wyoming. The area is several hundred miles west of previously known Wyoming carnotite deposits.

CLIMAX, COLORADO—Production of molybdenum concentrates in the United States are at an all-time high. August production from Colorado, Utah, Arizona, New Mexico, and Nevada mines at 5,613 tons was an all-time monthly high.

JOHANNESBURG, UNION OF SOUTH AFRICA—South African gold miners are no longer required by the government to sell gold on the free market in manufactured form or with a manufacturing intent affidavit.

BATESVILLE, ARKANSAS—The federal government has cancelled its manganese production contract with Westmoreland Manganese Corporation because no concentrate has been produced and delivered.

GRAND JUNCTION, COLORADO—The number of Colorado Plateau uranium miners and shippers to the United States Atomic Energy Commission's authorized buying agencies has increased to over 600 from the 422 earlier this year.

OSLO, NORWAY—The Norsk Bergverk A/S has shipped its first columbium concentrate to the United States. The ore is mined and concentrated at the firm's Telemark mine.

JUNEAU, ALASKA—The Kenai Chrome Company has shipped its first lot of chromite ore from its Red Mountain mine to the United States government under terms of its contract.

SPOKANE, WASHINGTON—Bear Creek Mining Company, the exploration subsidiary of Kennecott Copper Corporation, making a geologic examination of the old I. X. L. copper mine in Washington County, Idaho.

TOKYO, JAPAN—September production of 8,700 tons of electrolytic copper set a new monthly Japanese post-war record.

BUHL, MINNESOTA—The first shipment of iron ore has been made from the Michael open-pit mine of the Sylvia-Dee Mining Company. It is the newest mine on the Mesabi Range.

KUALA LUMPUR, MALAYA—The Raub Australian Gold Mining Company, Ltd., largest gold producer in Malaya, is now commercially recovering scheelite from its ore. Production is being increased as a milling plant addition has been completed.

MONTICELLO, UTAH—There are now more than 17,000 uranium mining claims recorded at the San Juan County courthouse here.

JUNEAU, ALASKA—Quebec Metallurgical Industries, a subsidiary of Ventures Ltd., has optioned claims covering a large magnetite deposit near Klukwan.

POTOSI, MISSOURI—The St. Joseph Lead Company has started its new 2,500-ton-per-day lead mine and mill at Indian Creek.

Operations Begin At New Jersey Zinc's Tenn. Mine

Shaft sinking has been started by Utah Construction Company on New Jersey Zinc Company's property located about one mile south of Jefferson City, Tennessee on the Dandridge Highway where a large zinc mining project is planned. Sinking of the 1,300-foot shaft is expected to take about 14 months.

New Jersey Zinc acquired the property in 1947. Subsequent drilling indicated that the ore body is a lead-free zinc sulphide typical of other zinc occurrences in eastern Tennessee. Plans also call for construction of a 1,000-ton-per-day mill.

Johnson Crawford, Tennessee superintendent for New Jersey Zinc, is in charge of operations for the firm. Utah Construction Company has assigned Frank Laird as construction manager, H. C. Worthem as general superintendent, and Wayne M. Glade, just back from a Korean assignment for Utah Construction, as office manager.

Tsumeb and O'okiep Will Operate Safari Properties

The operations of the Safari Exploration Company Ltd. in the Lomagundi district of Southern Rhodesia have been taken over by a new group, Sebungwe Mines and Exploration Company Ltd., formed by Tsumeb Corporation and O'okiep Copper Company, Newmont Mining Corporation subsidiaries.

Safari recently acquired an option over 31 blocks of claims owned by Sanyati Mines Ltd., and continued prospecting and exploration operations on these claims. A drilling program is now in progress to determine the persistence of the deposits in depth.

The ore is complex—copper, lead, zinc, and silver oxides and sulphides. It is believed that the outcrops of discontinuous ore bodies extend over 11 miles. Exploration will be continued for some time before placing the property in a development stage. The concession includes the old Copper King and Copper Queen mines which were last worked in the late 1920's. (See MINING WORLD, October 1953, page 83, for details of the option.)

Bear Creek Mining Doing Field Work in East Minn.

The Bear Creek Mining Company, exploration subsidiary of Kennecott Copper Corporation, is blocking up a large acreage of ground in Cook and Lake Counties, Minnesota, east of the Mesabi Iron Range. This is the area in which low-grade copper-nickel mineralization, probably syngenetic, was discovered several years ago in the Duluth Gabbro north and east of the iron formation.

Bear Creek's field work is being directed by geologists from the company's Minneapolis geological office.

This Diesel-powered Dumptor dumps another load of waste rock on the surface stockpile. Note the exhaust gas conditioner (far right) which is a standard item on all North Friends Station's underground Dieselized equipment.

Mechanization and Trackless Mining

Slash Costs at North Friends Mine

By Howard L. Waldron
New York District Manager
MINING WORLD

Rubber-tired drilling rigs move in to the face and drill 110 to 120 feet of hole per machine shift. Tractor-mounted loaders scoop 8¼ tons of broken ore into Diesel-powered trucks. The truck driver pulls away from the loader, drives along underground haulage roads to the bottom of an 1,100-foot inclined truck haulageway; his truck roars up the incline to its portal, and he dumps his load in a waiting railroad car. That is the North Friends Station mine of American Zinc Company of Tennessee. And despite its small size (500 tons per day), it is American Zinc's most efficient operation in Tennessee.

One secret of handling ore efficiently is to handle it as seldom as possible. Haulage at North Friends does just that; in one step it includes what in many an underground mine would be haulage, dumping, loading to skips, hoisting, and loading into cars.

The mine also has a nearly perfect safety record—with no serious accidents.

Too Small & Deep for Pit

When exploration drilling results had been evaluated, the North Friends ore body totaled about 500,000 tons. The ore body is fairly thick (minimum 13 feet; average about 20 feet), and fairly continuous.

The ore is found in the dolomitic limestone of the Kingsport formation in the Knox dolomite. The rocks have been fractured and in certain areas recemented with sphalerite, dolomite, and calcite to form ore. The ore bodies dip from nearly horizontal to nearly vertical.

The ore body proved to be too deep for open pitting. The average depth of about 170 feet would have meant a stripping ratio of 7.5 to 1.0. It was so low in grade that costs had to be comparable to open-pit mining costs.

The mining solution was something that you might call an "underground open pit."

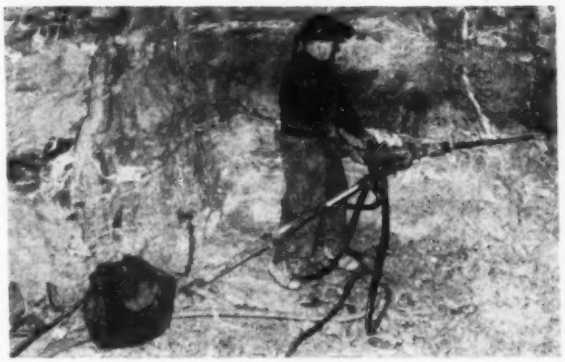
American Zinc bought the necessary equipment, and began to develop the mine in August of 1951. Only six months later, on February 13, 1953, the mine went into production.

Incline—$75.00 per Foot

In the first step, miners sunk the haulage incline to pierce the orebody. It goes down for a total length of 1,100 feet at a grade of minus-11½-percent (6° — 34′). It is unlined, 17 feet wide and 13 feet high. Complete with a 30-inch ventilation line, an 8-inch air line, and other minor features, it cost only $75.00 per foot.

For sinking it, four Joy hydro drill jibs were mounted on a Koehring WD-60 Dumptor truck. A crew of four miners on each shift drilled a

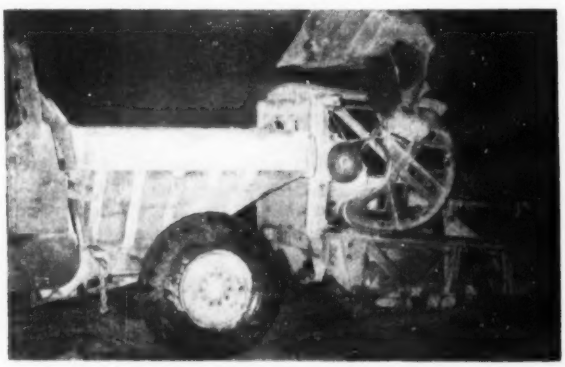
Flexible Drilling



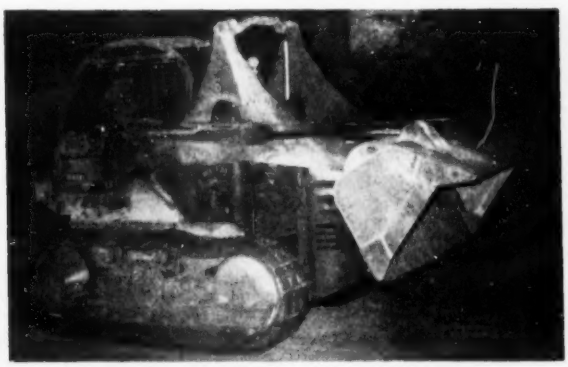
Drilling in sublevel stope 60 feet above main ore body is done by H. R. Trout with a Gardner-Denver S-48 air leg.

Rubber-tired drill rig, two-machine Joy Drillmobile, drills 115 feet of hole per machine shift, and mines to full height of orebody.

Diesel Powered Loaders



Tractor mounted loader, Eimco 104, loads ore into rubber-tired Dumptor in 1¼-yard scoops. About seven scoops, and truck is full.



Lodover, Hugh Russell operating, drags heavy lengths of 6-inch by 20-foot Victaulic air line to new working place.

Stope To Surface Haulage

This rubber-tired Koehring WD-60 Dumptor discharges its load of ore directly into railroad car. Ore was loaded 2,000 feet away in the mine and hauled to the surface up the incline.

Dumptor is used to haul waste rock from mine to surface stockpile near parking lot. Waste is good grade of lime-rock. John Davis is the operator.

H. A. Coy, general superintendent of American Zinc's Tennessee operations: "The Mascot district ore bodies are low grade. We have to stay abreast of all types of mechanization, as low operating costs are essential."

round of 36 holes to a depth of 6 feet. They loaded cut holes with 60-percent semi-gel explosives; rib holes with 40-percent semi-gel; and detonated them with electric MS delay caps. Each round netted about 5 feet of advance. One Eimco 104 loader (bucket capacity 1¼ yards) scooped rock into two Dumptors on haulage. The normal cycle was round-in, round-out on each shift.

About 250 feet down the incline, miners cut a water course flowing 500 gallons per minute. As foreman W. C. "Bill" Armstrong remembers it, "it was a tossup whether we would win or the water would. We finally dammed it off with a concrete wall, installed pumps, and lowered the water."

Install the Sump

The incline had tapped water in four different places. The ore body, too, seemed likely to be wet.

Miners first extracted the deepest section of the ore body. After complete extraction, the open stope became the sump. It holds 400,000 gallons of water. The dewatering pump is a Peerless deep-well (bowl type) with a capacity of 1,400 gallons per minute at the 190 feet of head. The pump column bottoms in the deepest part of the sump through a 15-inch vertical churn-drill hole. Pump operation is entirely automatic, controlled by floats in the sump.

The sump itself also serves another purpose. The water level is shallow enough so that loaders and trucks can drive into it. Waters, draining from other parts of the mine, carry fine ore in suspension. And this fine ore assays well above average in zinc content. At intervals, and especially when the price of zinc is high, the sump will be cleaned out with a loader and a truck.

Drill From One Spot

The company uses three Joy Drillmobiles for all production and development drilling. Two are usually for stoping, and one is used on development, in ore or waste. They are self-propelled, powered by two 15-horsepower air motors. Each is equipped with two Hydro drill jibs, which allow for a 120-inch (10 foot) steel change. Steel is 12-foot-long, 1-inch hexagonal, fitted with carbide inserts.

In their method of mining at North Friends, supervisors have tried to take full advantage of the flexibility and long reach of the drilling machines, and at the same

William "Scotty" Black, assistant general superintendent: "Mr. Coy and I try to give supervisors every chance with their new ideas. In turn, the men in our St. Louis, Missouri headquarters office approve almost all our recommendations."

time minimize movement of these machines. The ore occurs in large lenses. When a lense is large enough, 15-foot pillars are left 55 feet center to center (40 feet between pillars), in a rectangular pattern. Drilling crews then drive a drift 17-feet wide, the full height of the orebody, two rounds into the stope. Then they slab drill (in a direction parallel to the drift) until they reach the other line of pillars. After a pillar is turned, each Drillmobile works in three directions—forward and to each side. That means a minimum of movement. In thick parts of the orebody, the Drill jibs are turned straight up to drill back holes.

Blast and Load

Two powdermen on one shift handle all loading and blasting. They use

LEFT: Mine yard is simple. It includes railroad siding, shop, offices and dry, parking area, waste-dump area, and portal (arrow). RIGHT: Mine foreman, William "Bill" Armstrong, is a first-rate mechanic. He has suggested several useful modifications to manufacturers of North Friends' equipment. Portal is behind him.

J. L. "Jack" Kellogg, assistant superintendent of mines in Jefferson County: "We have to keep our thinking flexible in this type of mining. We have a wide variety of conditions in our mines; and new problems mean new solutions."

30 percent stick powder and 11 delays of electric millisecond-delay caps.

For loading, the company has two Eimco 104 Diesel-powered Rocker-Shovels (with 1¼-yard buckets), and one TD-9 International Lodover. The Eimcos are confined to loading duty. The Lodover is also used for loading; but more frequently, because its hydraulic control allows it to be used as a hoist or grader, it is used on general mine duty.

The crew which operates loaders and trucks are trained in the use of both. When one of the men is absent, another can take his place. A short-handed crew frequently gets out a full day's production.

Scrubbers on Exhaust

The Koehring WD-60 Dumptors hold 8¼ tons each. Each of the three is powered by a General Motors Series 71, 2-cycle, 4-cylinder Diesel which develops 109 brake horsepower.

Exhaust from each truck and loader goes to a 27-gallon scrubber, in which 2- to 4-inch limestone acts as the absorbent and acid neutralizer. Each scrubber contains 8 pounds of fine copper wire on a perforated plate suspended in the water bath; it speeds the entrapment of aldehyde gasses, the drivers keep their scrubber tanks full of water, and flush them after each 8-hour shift.

The scrubbers have done their job well. In terms of carbon monoxide, aldehydes and nitrous oxides, the exhausts and the air in the mine are well under permissible limits.

M. J. Langley, superintendent of mines: "Every air leg machine we have tried has given us a lower cost than the column mounts. And tungsten carbide, whether in threaded bits or insert steel, will give a lower cost than threaded-steel or single-use bits."

Low Haulage Costs

When they started North Friends, the supervisors had allowed for rather high maintenance costs for the haulage units. To the contrary, after more than a year of operation maintenance costs have proved extremely low. Foreman Armstrong says "only slight repairs have been necessary on the engines, and Dumptor maintenance has been almost nil. They run along month after month with almost no repairs, with the result that total haulage cost has been much less than estimated."

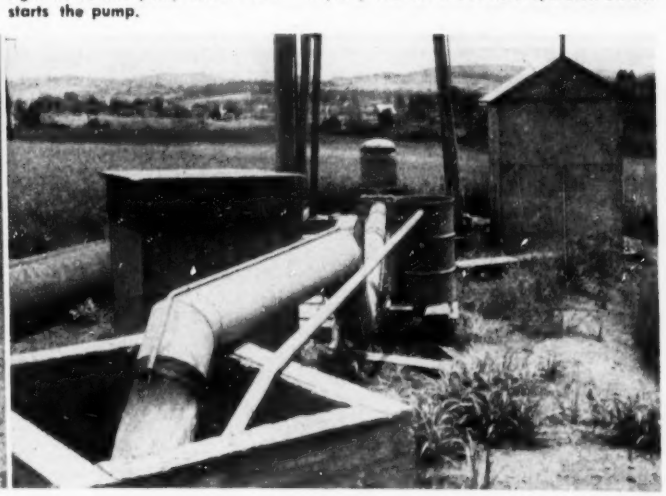
"But," he says, "we did heavy damage to two engines, in a way that hadn't occurred to us, and I'll pass it along in the hope that someone else may avoid similar trouble. The Dumptors were on the incline, motors running. They rolled back in gear, began to turn over in a reverse direction, sucked air and scrubber water in through the scrubber exhaust, and the motors were out of commission. Since then, we have eliminated that trouble with two check valves in the exhaust-scrubber line. They allow air intake through the exhaust but prevent water intake."

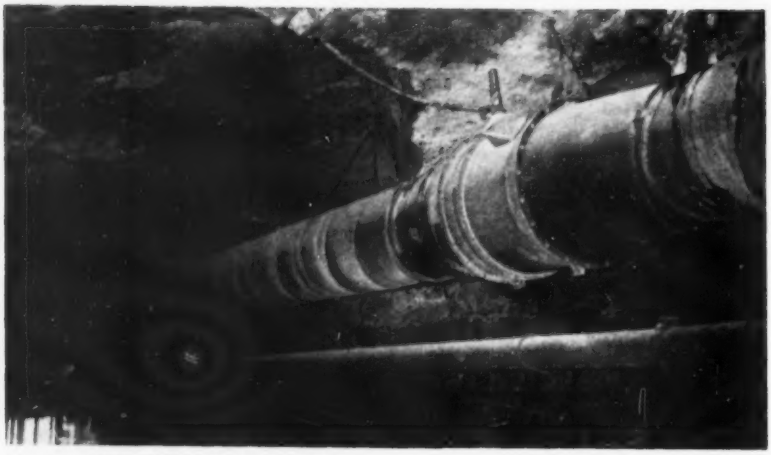
The railroad siding is equipped with a truck-dump ramp. For North Friends Station, the company built a 3,000-foot spur line to the main line of the Southern Railroad. Ore is hauled by the Southern Railroad directly to the main mill at Mascot. Waste is dumped in space provided for that purpose on the surface.

Simple Ventilation

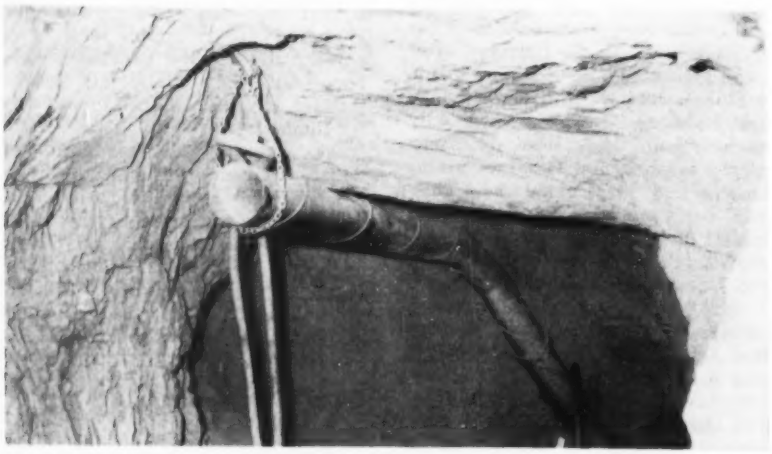
Fresh air comes into the mine through 10- and 12-inch churn drill

LEFT: Powdermen William "Bill" Smith (left) and J. A. "Arlie" Wyrick load 30 percent stick powder into a stope round. Note the handy tray of millisecond delay electric caps at right. RIGHT: The Peerless, 100 horsepower, water-lubricated, vertical turbine pump in background keeps the North Friends Station mine dewatered. Note the 1,400 gallons of water per minute discharging from the pipe in the foreground. Before pump automatically starts, the water in the 55-gallon drum at right flows into pump column to insure pump lubrication. A flota-operated switch starts the pump.



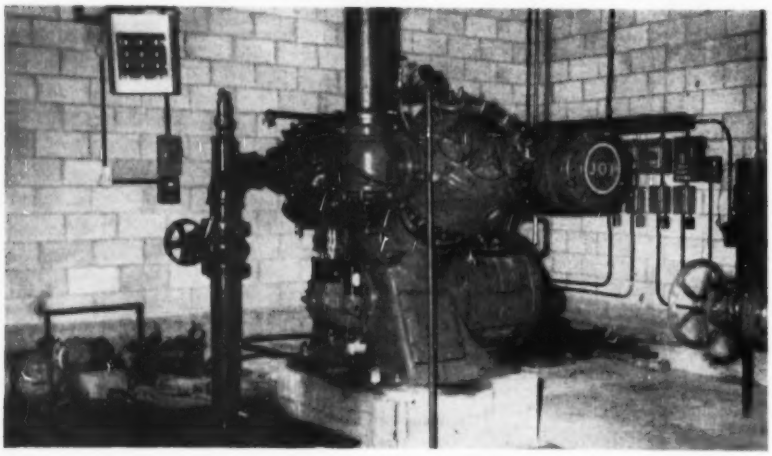


Mine Ventilation Air: Series 1,000 20-horsepower Joy Axivane fans are installed in-line in 30-inch Naylor pipe. Boosters can be installed where needed.



Sublevel Ventilation Air: 8-inch wedge-lock line comes to sublevel from main vent line. It exhausts air, removes powder smoke quickly.

Compressed Air: The mine is supplied, in part, by this Joy class WN-112 compressor. Main air line into mine through the incline is an 8-inch diameter pipe.



holes; some were exploratory holes; some were drilled deliberately to aid ventilation. The exhaust air system consists of a main line of 30-inch Naylor pipe, with feeder lines as small as 8 inches in some stoping areas. Near the top, and again at the bottom, of the incline, a series 1,000 Joy Axivane fan powered by a 20-horsepower motor is installed in the main air line. American Zinc modified the fans for the 30-inch line in its shops.

The entire ventilation system is extremely flexible. Where more air is needed, another churn-drill hole can be put down. Where more exhaust power is needed, another fan can be installed in the line. Air is compressed by two Joy Class WN-112, model E compressors installed on the surface. A 150-horsepower unit supplies 787 cubic feet per minute and a 100-horsepower unit supplies 550 for a total air supply of 1,337 cubic feet per minute at 90 pounds per square inch pressure.

Flexible Mining

The trackless system of mining has proved extremely flexible. For instance, one 7,500-ton orebody was 60 feet above the elevation of the trackless stope. Drillers drove a 60° chute raise, 5 by 5 feet in cross section, up to it, installed an air-operated steel chute mouth, and it is mined as a small air leg stope. Ore flows into the chute, is loaded into a Dumptor, and presto—it's in a railroad car on the surface.

Another example is in the underground haulage roads. They can be built on either cut or fill. When a fault drops part of the ore zone (and it frequently does), the crew builds a ramp to it, never missing a pillar.

Another important feature of trackless Diesel mining comes with use of big trucks and tractors which can drive in to any part of the mine. Powder comes right to the working place in a Dumptor. Heavy lengths of 30-inch ventilation pipe and 8-inch steel air line are brought in by truck, lifted into place with the Lodover. Equipment is hauled into and out of the mine at any time. And any time one of the men wants to go underground, he goes; there's no waiting for the cage.

That, briefly, is North Friends Station mine. You get an idea of its efficiency from a remark by mine foreman Armstrong: "This country around Knoxville uses large tonnages of lime-rock for fertilizer. I believe that after we've mined out the zinc ore, we can make money on it as a limestone mine."

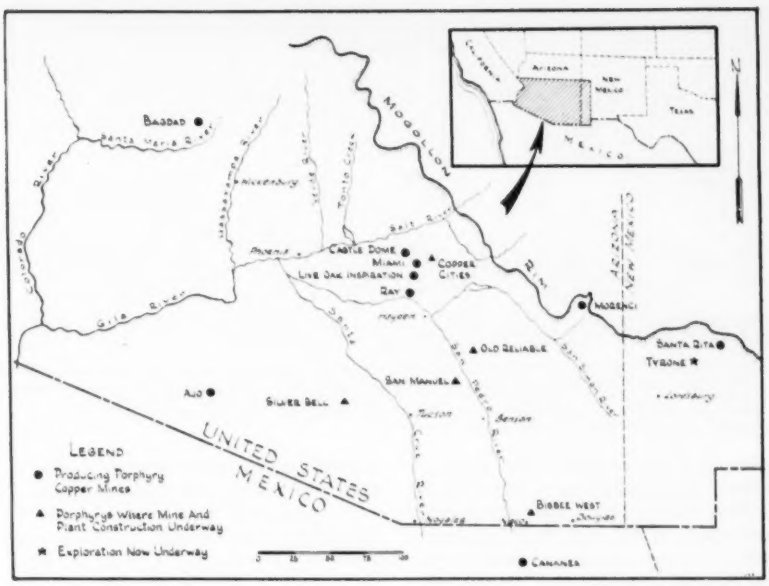


Plate No. 1. Location of the Southwest Porphyry Coppers. Note that they are all south of the Mogollon Rim. Active search is underway seeking similar copper deposits.

The 16 Southwest Porphyry Coppers Now In Period Of Greatest Activity

By Carl Trischka*
Warren, Arizona

Mr. Trischka's article is a sort of 50th anniversary report on the growth and development of the porphyry coppers—a timely report on the porphyrys where new plants are being built—a tribute to the men of the mining fraternity who through their genius transformed formerly worthless material into valuable resources—Ed.

The porphyry coppers of the southwest—13 in Arizona, two in New Mexico, and one in northern Mexico—are currently in the period of their greatest activity. Not since the period from 1907 to 1912 has there been so much activity. Three new mines are scheduled to start production in 1954. They are: the Silver Bell of the American Smelting and Refining Company; the Copper Cities of the Miami Copper Company; and the Old Reliable of the Copper Creek Consolidated Mining Company. The first two are open pits while the last will be block caved followed by inplace leaching.

The prospector with his burro has discovered most of the high-grade ore bodies. New mines which are being brought into production are mostly for low-grade ore. For the successful location and development of the low-grade copper mines, that is, the porphyry coppers, the old prospector was not prepared because a large sum of money, modern equipment, and scientific knowledge are needed to make them pay. However, it takes more than these items to create wealth from these resources. The vision of free enterprise keeps them from lying idle and worthless.

Two Key Geological Events

During the 60,000,000 years of the Laramide revolution (which closely paralleled the Tertiary period both in time and years), and extending into the beginning of the Quaternary period, two important geological events occurred.

First, the continuous and very powerful activities of large masses of plastic igneous material moved about below the thin hard surface crust of the earth, resulting in the formation of the Rocky Mountains. These mountains were tilted and shattered with broken blocks of sedimentary rocks and intrusions of igneous rocks. Hot mineral-bearing solutions, coming from great depths, deposited primary mineralization in both the sedimentary and igneous rocks. This deposition took place over wide areas and to considerable thicknesses in previously shattered and fractured zones in such rocks as schist, porphyry, granite, monzonite, limestone and others.

Thus, the beginnings of low-grade and other ore bodies were established, with their pyrite and chalcopyrite dissemination, large and small veins, and replacement bodies —that is, the porphyry and other copper ore bodies. Some of the low-grade copper deposits may have been exposed long enough to have been secondarily enriched before the cover was placed on them by a second geological event.

Toward the end of the period described above, a large part of southern Arizona and New Mexico, as well as the northern part of Sonora,

* For 31 years, Mr. Trischka was chief geologist for the Phelps Dodge Corporation with headquarters at Bisbee, Arizona. He is now retired.

Table No. 1
Time and Dollars Expended To Bring Southwest Prophyry Coppers Into Production[1]

Mine	Years From Start to Production	Preparatory Cost	Concentrator Capacity Tons Daily Beginning	Concentrator Capacity Tons Daily Present	Smelter
Ajo	1913-1918	$ 25,000,000	5,000	29,000	Ajo
Bagdad	Forty years	10,000,000	4,000	9,000	El Paso
Bisbee West Pit	1909-1917	10,000,000		4,000	Douglas
Cananea, Mexico	Four years	9,000,000		12,000	Cananea
Inspiration, Live Oak	1909-1915	15,000,000	7,500	15,000	Inspiration
Miami	1906-1911	10,000,000	6,000	18,000	Inspiration
Castle Dome	Seventeen months	12,000,000	10,000	12,000	Inspiration
Morenci	1928-1939	80,000,000	25,000	50,000	Morenci
Ray	1906-1912	15,600,000	8,000	15,000	ASARCO, Hayden Smelter
Santa Rita, New Mexico	1910-1912	10,000,000		22,500	Hurley
	Total	$196,000,000			

1. These figures are compiled from various sources, and particularly from yet unpublished manuscripts about Arizona's low-grade coppers by Frank J. Tuck, statistician, Arizona Department of Mineral Resources, Phoenix. From the same source there also has been used, by permission of the author, some general information regarding the various properties.

Mexico, were covered with a thick blanket of basaltic and other types of flow rocks which came from the northeast. (This is shown in section No. 1). Deep erosion set in during the Quaternary period which followed the Tertiary and this has been continuing for the past 1,000,000 years. (Results are shown in Section No. 2).

Mogollon Rim Important

The area lies southwest of the Mogollon Rim (shown in Plate No. 1) and has been denuded of the flow rocks mentioned above, except for small remnants or patches of the mountain tops here and there. Over a long period of time, erosion has gradually cut away, in places, as much as 2,000 feet from the surface of the land, making it possible for the surface and rain waters to penetrate progressively to increasing depths of the mineralized area. Consequently, the copper content has continued to increase because of the secondary enrichment process, and the original copper content of about 0.3 or 0.4 percent in the primary mineralization has become enriched sufficiently to be considered as a porphyry copper ore deposit. Generally, the average grade of the resulting low-grade copper ore body is less than 2.0 percent. In places, the upper parts of such deposits may be much higher grade than the average.

There are no known low-grade copper deposits northeast of the Mogollon Rim because that area remains covered by surface flows, concealing possible exposure of such deposits. Southwest of the Rim, the erosion activities in the Gila and Salt River drainage basin cut through the flow rocks and exposed the outcrops of the porphyry coppers which have been found. Others may be found and are being searched for. (See Section No. 2).

Starting Porphyry Coppers

The first attempt to mine a low-grade porphyry copper deposit on a large scale was made in 1899 when Daniel C. Jackling developed an open pit in Bingham Canyon, Utah. His successful recovery of copper from the Jackling pit has brought about the use of the term "porphyry copper" for this type of low-grade copper deposit. Still producing, today the deposit is operated by the Utah Copper Division of Kennecott Copper Corporation.

In 1899, copper minerals were recovered by gravity concentration. Around 1913, J. Park Channing introduced flotation. This method made higher extraction possible and lowered the cost of milling, permitting the mining of lower grades of ore, and thereby increasing the reserves of a given ore body.

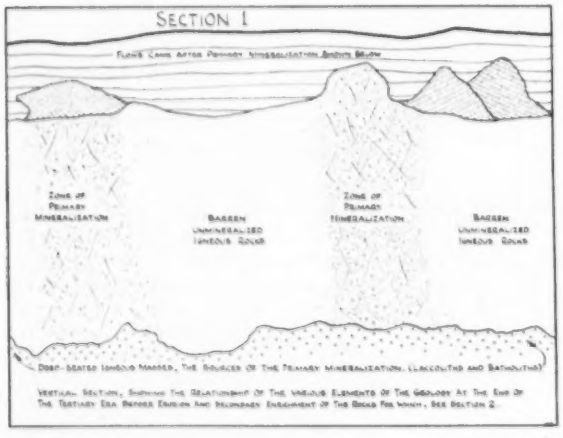
There are 16 low-grade copper deposits in Arizona, New Mexico, and Mexico. Nine are being mined, one has been depleted, five are in process of being developed, and one is being test drilled with promising indications of ore. (Locations of these deposits are shown on Plate No. 1).

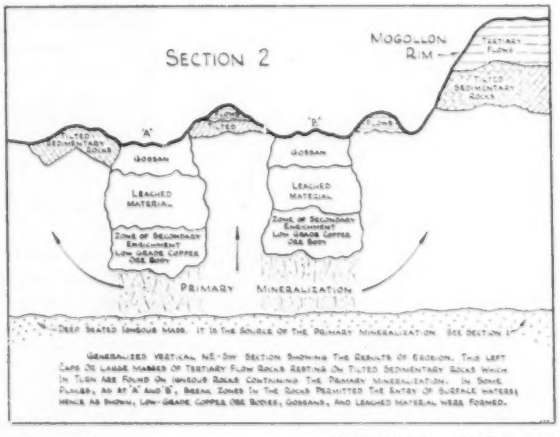
When the porphyry coppers were first mined, the minimum average grade was about 2.00 percent or 40 pounds of copper per ton. With the increased efficiency of surface mining methods, advanced knowledge of concentrating techniques, the change from gravity concentration to flotation, and the generally higher price for copper, ore with as little as 0.7 percent or 14 pounds of copper per ton is now being mined and processed at a profit from some open pits.

Just how much time it takes, and what it costs to bring a low-grade copper ore body to the point of production are shown for the various mines in Table No. 1. During the life of a mine, a profit must also be made.

Operating Properties

Ajo Mine is working as an open pit and is owned by the New Cor-





Inspiration—one of the most famous Southwest porphyries has been producing copper since 1908. The famous twin shafts, electrolytic and leaching plants are shown here. Block caving and open pit mining history has been made by Inspiration.

nelia Branch of the Phelps Dodge Corporation.

The ore occurs in monzonite which has been intruded by lavas and tuffs. The primary chalcopyrite is associated with pyrite and both are disseminated in the rock. It is thus the exception to the other low-grade ore bodies, all of which owe their enhanced copper values to secondary enrichment.

The mines at Ajo have been known since 1750 when the Spaniards mined copper there. It is perhaps the oldest known copper mine in Arizona. In 1854, rich copper ore was hauled by ox carts from Ajo to San Diego, California whence it was transported by ocean-going vessels around Cape Horn to Swansea, Wales, to be smelted.

Ajo was examined for low-grade copper ore possibilities in 1909 but was turned down, and, in 1931, by merging with the Calumet and Arizona Copper Company, the Phelps Dodge Corporation acquired the Ajo mine.

A unique feature of the deposit is the low ratio of 0.21 tons of waste to 1.0 ton of ore. It was discovered during the drilling program of the Calumet and Arizona Mining Company of Bisbee, started in 1911, that the overburden of oxide ore above the water table had practically the same copper content as the primary ore below it.

After much experimentation, a system of leaching was developed for the oxide ores which were mined and treated in vats where their copper content was extracted by acid solutions. The resulting copper-bearing solution was piped to an electrolytic plant; there the metallic copper was recovered as cathodes which were shipped to the smelter of the Calumet and Arizona Copper Company at Douglas to be melted and cast into suitable shapes for industry.

There was practically no tonnage of secondarily enriched ore between the oxide and sulphide zones and this very flat transitional zone was less than 50 feet thick in its thickest part.

The flotation concentrator was started on sulphide ore from the pit in 1924 and its concentrates were shipped to the smelter at Douglas; however, since 1952, it is smelted in the Phelps Dodge Corporation's new Ajo smelter which cost $5,000,000 and is located adjacent to the mine and concentrator.

Bagdad mine. Formerly worked unsuccessfully by underground methods, it is now, after 40 years, an open-pit operation owned by the Bagdad Copper Corporation. It is located about 40 miles west of Prescott.

The sulphide ore contains secondarily enriched sulphide is treated sure veins or disseminated in granite porphyry. Low-grade porphyry copper possibilities were first considered in 1907 but the values found were at the time considered too low for exploitation.

The ores from the pit go to a concentrator and the concentrate from it, from which some molybdenum is first recovered, is shipped to the American Smelting and Refining Company's smelter at El Paso, Texas.

Inspiration mine. It was formerly operated entirely by block caving. Mining now includes an open-pit known as the Thornton. Owned by the Inspiration Consolidated Copper Mining Company which started mining in 1908, it has been producing copper ever since.

The ore is found in shattered schist and granite. The overburden with its mixture of oxide and secondarily enriched chalcocite in fis- in vats by the addition of water and ferric sulphate. The resulting copper sulphate solution is piped to a precipitating plant. This process has been in operation since 1926. Underground leaching in the worked-out caved sections of the mining area results in the recovery of copper from the unmined low-grade ore.

The constant change in the search for better methods of mining and metal extraction is illustrated by the fact that in 1915 Inspiration had the largest flotation concentrator in the Southwest; yet, as set forth above, by 1926 this was changed entirely to leaching. To do this, many millions of dollars had to be spent.

Cananea, Sonora, Mexico mine. It is now an open-pit operation which was brought into production during World War II at the request of the United States Government which loaned money to increase copper production. It is owned by the Anaconda Copper Mining Company.

The ore is in monzonite porphyry secondarily enriched. There is an appreciable amount of molybdenum in the ore. This byproduct helps pay the mining expenses. The sulphide ore is concentrated by flotation and concentrate smelted in the company's nearby smelter.

Miami mine. This is an underground mine owned by Miami Copper Company. It was started in 1908 when gravity concentration was in vogue but long since then concentrating method has been changed to flotation.

The ore is in schist, monzonite porphyry, and granite; the copper values are due to secondary enrichment. There is oxide ore present which is being leached. The sulphide ore is treated in a concentrator and the concentrate is shipped to the International Smelting and Refining Company's smelter at Miami.

Castle Dome. This open-pit mine, about eight miles west of Miami, is operated by the Miami Copper

Table No. II
Total Production of Southwest Porphyry Coppers in Tons Mined, Pounds Copper Recovered, and Copper Value[1]

Mine	*Period (Years)*	*Tons Ore Mined*	*Pounds Copper Recovered*	*Dollar Value*
Ajo leach	1917-30	16,800,000	345,000,000	$62,000,000[2]
Ajo	1917-51	152,000,000	2,500,000,000	404,000,000[3]
Bagdad	1950-52	2,000,000	30,000,000	6,000,000
Bisbee, West Pit	1923-31	8,000,000	274,000,000	38,000,000
Cananea, Mexico	1943-52	39,000,000	650,000,000	130,000,000
Inspiration	1905-51	130,000,000	2,500,000,000	400,000,000
Miami	1911-51	140,000,000	2,100,000,000	333,000,000
Castle Dome	1924-51	33,000,000	420,000,000	66,000,000
		173,000,000	2,520,000,000	399,000,000
Morenci	1940-51	127,500,000	2,350,000,000	415,000,000
Ray	1911-50	122,120,000	2,600,000,000	423,000,000
Santa Rita, New Mexico	1910-51	147,000,000	2,500,000,000	380,000,000
Total		900,600,000	15,924,000,000	$2,595,000,000

1. Figures compiled from those of Arizona Bureau of Mines—sources such as Arizona Bureau of Mines *Bulletin* No. 140; *Minerals Yearbook;* and other sources and estimates. The figures are not always absolute.
2. Included in total production.
3. Total production.

Company. Under an RFC loan, within 17 months Bechtel Company contractors brought the mine into production in record time in 1943.

Morenci Mine. Also an open pit, this is operated by the Morenci Branch of the Phelps Dodge Corporation at Morenci. The low-grade Clay ore body in the Longfellow area is in quartz monzonite porphyry. The copper minerals are disseminated and in veinlets, all secondarily enriched, throughout the porphyry.

Morenci is the largest producer of copper in Arizona. Every day 50,000 tons of ore are mined and concentrated. Flotation concentrate is shipped to the adjacent $5,000,000 smelter of the Phelps Dodge Corporation.

In 1864 some mining was started in Clifton, which is close to Morenci. In 1880 the Phelps Dodge Company acquired a one-half interest in the Detroit Copper Company at Morenci. In 1886 the high-grade copper ores from the mine were exhausted. The first low-grade production was started in 1906. By 1922 the entire Morenci mining district was controlled by the Phelps Dodge Corporation. The drilling campaign which outlined the Clay ore body was started in 1928 and by 1937 stripping operations were in progress and production of ore began later.

Ray mine. It was formerly an underground mine; it is now changed almost completely to an open-pit operation. The ore body at the start of mining in 1916 was in schist containing secondarily enriched chalcocite but recently the mineralized diabase formerly too low grade to mine has become ore as a result of the change in operations. A nearby porphyry intrusion is credited with being the source of the primary mineralization.

Some copper mining was undertaken at Ray in 1883, and in 1907 Daniel C. Jackling undertook extensive drilling operations. Mining and concentrating began in 1916. The operation was the first among the porphyry coppers to mine and concentrate more than 8,000 tons per day from underground mining.

The ores are shipped by rail 18 miles to the concentrator located where there is sufficient water at the junction of the San Pedro and Gila Rivers. The concentrate, in turn, is shipped three miles by rail to the American Smelting and Refining Company's smelter at Hayden.

The low-grade ores which were not mined underground are being leached and the copper from the solutions is deposited on iron. This process recovers from 500,000 to 1,000,000 pounds of copper per month.

The Ray Consolidated Mining Company was absorbed in 1924 by the Nevada Consolidated Mining Company and is now the Ray Mines Division of the Kennecott Copper Corporation.

Santa Rita mine, New Mexico. The mine is operated as the Chino open pit by the Chino Mines Division of Kennecott Copper Corporation. Mining operations started in 1910.

The ore is in porphyry and is secondarily enriched. The concentrator which beneficiates these sulphide ores ships its concentrates to the nearby company smelter at Hurly, New Mexico.

The Santa Rita mines were worked by the Spaniards for high-grade native copper, which was sent to Mexico City as early as 1800. John Pattee, the famous scout, worked the Chino deposit in 1825.

In 1905 it was first examined as having possibilities as a low-grade copper ore body. Stripping operations were started in 1910 and production got underway in 1912. It has operated almost continuously since.

Developing Porphyries

Copper Cities open pit. It is located three miles north of the International smelter at Miami and is owned by the Miami Copper Company. It is being readied for production by the time the Castle Dome open pit eight miles west of Miami is depleted. The equipment and concentrator at Castle Dome will be moved to and used at the Copper Cities mine.

This low-grade copper ore deposit, which was test drilled on a grid system with 250-foot spacing, is secondarily enriched and is found in monzonite.

This deposit was first drilled in 1921 but at that time it was considered too low grade to be mined at a profit.

Sacramento Hill open pit (West Ore Body). This ore body was mined by the Copper Queen Branch of the Phelps Dodge Corporation at Bisbee. It was drilled starting in 1913. Mining with a steam railroad and shovels lasted from 1923 to 1931, when the reserves were fully depleted.

Stripping operations were begun in 1917. From this, 12,000,000 tons were sent to the leach heap where much copper was recovered and 11,000,000 tons of waste were sent to waste dumps. The ore amounted to 8,000,000 tons which contained 274,000,000 pounds of copper.

Lavender open pit (East Ore Body). This will also be mined by the Copper Queen Branch of the Phelps Dodge Corporation. Stripping of the overburden began in 1950 and copper production is scheduled for late 1954.

Both the East and West ore bodies were deposited in pre-Cretaceous times and are thus the exception to the generally held belief that the porphyry coppers of the southwest were all due to the mineralization of Laramide times. The secondarily enriched ore body is in granite porphyry, greatly silicified, and the ratio of waste to ore is 1:00 to 1:00.

Mining on very high-grade copper ore was first done in 1878 in Bisbee and has continued to date for 75 years.

The Old Reliable mine, located 11 miles northeast of Mammouth, is being reopened by the Copper Creek Consolidated Mining Company.

The United States government has contracted to purchase a certain tonnage of copper from the mine for a

stipulated price per pound. In return, the company obligates itself to spend $150,000 to prepare the ore body for production and to construct a precipitating plant.

The mine is a low-grade copper deposit and the ore is going to be broken up underground by block caving. This broken ore will not be brought to the surface but will be left in the mine where the copper will be acid-leached.

The Old Reliable was first considered as a low-grade copper deposit in 1908 when work on two levels from a shaft was done, but the copper content as determined at the time was considered too low in grade to warrant further development.

San Manuel mine is near Tiger. It is owned and operated by the San Manuel Copper Corporation, a Magma Copper Company subsidiary.

It has been decided to use an underground block caving method of mining for the San Manuel ore body. This decision was reached after considering the very large tonnage of overburden which would have to be removed for open pit mining and the narrow and long shape of the ore body. Production of the secondarily enriched copper ore is scheduled for 1955 or 1956.

Drilling operations to delimit the deposit prompted in part by a large red gossanized surface area on the very large property, were first begun in 1946 and work on the project has been going on ever since.

Millions of dollars have already been spent by the Federal government and private enterprise on this venture and a recent Reconstruction Finance Corporation loan of $94,000,000 plus the $17,000,000 pledged by the Magma Copper Company under the terms of the loan, is to be spent merely to bring the property into production.

Silver Bell mine. Two open pits, one for oxide ore and the other for low-grade disseminated sulphide secondarily enriched ore, are being developed by the owners, the American Smelting and Refining Company.

The Castle Dome Copper Company, Inc. developed its Castle Dome ore body and built a milling plant in record time during World War II.

The ore is in monzonite and alaskite; copper minerals are chalcopyrite, chalcocite, and oxides of copper.

The life of the operation is estimated at about 12 years.

To place the property in production, the United States government granted a Reconstruction Finance Loan of $17,000,000 and the two open pits are to be ready to produce by 1954.

The Silver Bell mines were first operated for lead and silver and later for high-grade copper ores from about 1905 to 1915, at which time there was a smelter at the nearby town of Sasco.

Prospective Properties

Tyrone, New Mexico. This mine is operated by the Burro Mountain Branch of the Phelps Dodge Corporation. Drilling is in progress in monzonite to test the low-grade copper ore possibilities in the area. It is believed that results so far obtained give promise that a low-grade copper ore body will be found. How soon it may be developed is conjectural.

During 1913 and 1915, comparatively small low-grade secondarily enriched copper ore bodies were discovered, developed in part for underground mining methods, and the ore, at least some of it, tested in a pilot plant concentrator.

A depression came and shut down of the mine followed. Later leaching of the ore underground, in place, by acidic waters was done by bringing them into the mine directly or from the surface above, through cracks.

The resulting copper-bearing solutions were pumped into vats on the surface where the copper was precipitated. The copper precipitate is sent to the company smelter at Douglas, Arizona.

Operational Data Available

For further details on the abovementioned mines, see the following issues of MINING WORLD: May 1946, page 24, *Bagdad Copper Makes a Comeback;* April 1951, page 8, *Pit the Top—Cave the Bottom* (Inspiration Consolidated Copper Company); December 1944, page 17, *The Cananea Project;* October 1952, page 26, *Block Caving at Miami;* October 1946, page 40, *Castle Dome—An Outgrowth of War;* October 1948, page 23, *Castle Dome's New Orebody;* April 1940, page 11, *The Morenci Pit;* January 1953, page 26, *Copper's Newest Big Open Pit* (Kennecott Copper Corporation's Ray Mines Division); September 1946, page 44, *San Manuel: A Coming Porphyry;* August 1949, page 18, *Developing San Manuel;* and September 1953, page 42, *Inspiration is Combining Open Pit Mining and Underground Haulage.*

Table No. III

Some Details of Arizona Porphyry Coppers Now Under Development

Mine and Owning Firm	*Capital Outlay Before Mining Starts*	*Ore Grade - (Percent Copper)*	*Reserves (Tons)*	*Concentrator Daily Tonnage*	*Tons Copper Recovered Per Year*	*Year Mining Starts*
Copper Cities, Miami Copper Co.	$23,000,000	0.7	33,000,000	10,000	22,500	1954
Lavender Pit, Phelps Dodge Corp.	$23,000,000	1.14 0.42	41,000,000 31,000,000	12,000 leach material	23,400	1955
Old Reliable, Copper Creek[1] Cons. Mining Co.	$150,000					1954
San Manuel, Magma Copper Co.	$120,000,000	0.8	368,000,000 111,900,000	30,000 oxide.	70,000	1956
Silver Bell, ASARCO	$17,000,000	—1.0		7,500	18,000	1954

1. Underground caving and leaching with on-surface precipitation plant.

Mine and concentrating plant of the company Puy-les-Vignes which is the second largest French tungsten producer.

FRENCH MINES DOUBLE TUNGSTEN PRODUCTION IN TWO YEARS TO SUPPLY 40% OF NATIONAL NEEDS

Tungsten mining and exploration have been on the increase in France since July 1951 when the official price for concentrate was fixed at a level high enough to serve as an incentive for the French mining companies holding government concessions.

Production has been further increased by the modernization of milling plants at the most important mines, generally with equipment from the United States. As a result, the French are now supplying about 40 percent of their total requirements for tungsten.

Montmins Largest Producer

Although mining for tungsten and tin has been traced to the time of the Gauls and the Romans, it has only been since the first World War that important production has been made. The "Montmins" concession was granted in 1917 to cover a tungsten deposit in the Echassieres district of the province of Allier. Today this deposit has been developed to the point where it is the most important producer in France.

Production in 1948 was 211 metric tons of concentrate, 290 tons in 1949, and 183 tons in 1950. A new mill was completed in September 1950, and in 1951 production increased to 369 tons. Production in 1952 was nearly 430 tons of concentrate. Wolframite is recovered by gravity concentration utilizing Denver mineral jigs, Humphreys spirals, Wilfley and Deister concentrating tables, and Denver-Buckman tilting tables. Closed circuit crushing is done by Symons shortheads in circuit with Denver and Hummer vibrating screens.

"Puy-les-Vignes" Mines

The "Puy-les-Vignes" mines, now the second most important tungsten mines in France, were discovered in the early part of the 18th Century. Wolframite was found in the St. Leonard region of Haute Vienne province by Lapeyrouse who at that time was surveyor of mines. During the continental blockade, the Imperial government ordered chief mining engineer De Cressac to conduct investigations for tin occurrences. He directed the digging of a pit 30 meters deep but no ore was found.

Work was resumed during the Second Empire in 1857 by an Austrian who later transferred his rights to Lemaigre-Dubreuil to whom the concession was formally granted in April 1863. The mine was closed in 1866 and reopened by a German in 1870.

The well-known electrometallurgist, Paul Girod, started the manufacture of ferrotungsten in 1900 and acquired the mine in 1904 as a tungsten source. Mine development continued—the Girod shaft was sunk to a depth of 100 meters and a concentration plant was built. Operations varied with the changes in the world price for tungsten. However, production was fairly steady at between five and 10 tons of 74 percent WO_3 concentrate per month despite mining difficulties caused by heavy water inflows. The tungsten was used for making alloy steel at Girod's Ugine Works.

During World War I, the lack of coal necessary to generate power caused flooding of the mine on several occasions and operations ceased in 1917. Total production during the

French Production of Tungsten Concentrates
In Metric Tons from 1941 through 1952*

	MINES					
Year	*Puy-Les-Vignes*	*Montmins*	*Leucamp*	*Teissiere*	*Others*	*Total*
1941	101					101
1942	78					78
1943	82					82
1944	47					47
1945	140					140
1946	136	40	69			245
1947	160	109	79	12		360
1948	214	211	64	13		502
1949	233	290	114	6	2	645
1950	116	183	109			408
1951	206	369	131			706
1952**	292	430	140	2		864

* Concentrate grade between 66 and 70 percent WO_3.
** Estimated from actual first six-month production figures.

period from 1906 to 1920 was about 900 metric tons of concentrate.

Exploration was resumed in 1938 by an association formed by Paul Girod and E. Brandt which led to the establishment of the Mines de Puy-les-Vignes Company.

In 1950 the concentration plant which had been installed in 1938 was re-built and has been operating continuously since. Concentrate production in 1949 was 233 metric tons, but output dropped to 108 tons in 1950 during plant remodeling. At the same time, the mine was deepened to the 220-meter level; stoping was started on this level—the mine's 13th level.

With the new plant supplied by ore from the deeper level, the operation has a capacity of 250 tons of concentrate per year making it the second largest tungsten producer in France.

The orebody consists of a mineralized quartzite breccia averaging 0.50 percent WO_3 cut by a series of higher grade veins. Stoping is usually continued to the wall of one of the veins. Mineralization continues beyond these wall veins but diminishes rapidly in grade.

The Leucamp Mine

The Leucamp outcrop was discovered in 1912 near Cantal. Initial mining was done during the first World War when 5,500 tons of ore were mined and milled to yield 84.5 metric tons of 70 percent WO_3 concentrate.

Ore is found in a series of parallel quartz veins 6 to 30 inches wide cutting mica schists. Some 12 of the veins have been mined. The company Des Forges et Acrieries de la Marine et d'Homecourt has operated the mine for a number of years. Ore is sent to the concentration plant of Cie des Acrieries de la Marine at Boucau for treatment.

Germans Reopen Montbelleux

The Montbelleux mine at Bretagne (Ille et Vilaine) in Luitre and Parce counties was discovered in 1905. Exploration between 1914 and 1917 located 12 veins. After a long period of inactivity, exploration was resumed in 1936. During the German occupation of France in 1942, the mining organization "Todt" operated the mines, deepened two shafts to depths of 130 and 260 meters, and built a concentration plant. Some 500 men worked there.

Shortly before the Allied landings in Normandy, the Germans removed some of the equipment and the mines were flooded. The mines remain flooded but the ore reserves are believed to be fairly large so reopening of the mines started in 1952.

The Gauls and Romans are known to have recovered tin from the tin-wolframite veins at Vaulry et Cieux, Haute Vienne province.

Other Known Occurrences

Small production has been made in the past from the mine and mill at the Teissieres deposit. Work was resumed recently by the company Ste des Mines de Tessieres who started an exploration program and built a small concentration plant.

One of the few known scheelite occurrences, in association with bismuth, is the Meymac deposit in Millevaches, Correze. The ore is complex, containing both oxide and sulphide cobalt and bismuth minerals. It is the type local for the tungsten mineral meymacite whose formula approximates WO_3-$2H_2$. Some exploration was started in 1949.

Other attempts to mine wolframite deposits have been made in La Creuse province where the company Ste des Mines de Cuivre prospected in 1943 near Chatelus le Marcheis—and also near Janaillat and at Montebras near Boussac.

Prospecting by the company Miniere du Massif Central at the recently discovered veins in Tarre province 10 miles northwest of the Peyrebrune mines, and by the company Miniere du Massif Central near Muols in Puy-de-Dome province, could indicate important deposits.

Conclusions

In the final analysis, production from the lower grade and smaller deposits must be dependent upon a continuing high level of world prices. This is graphically shown by the fact that production has been more than doubled in the last two years with a higher price.

Output of the three most important mines—Montmins, Puy-les-Vignes, and Leucamp—is between 30 and 40 percent of French consumption. Modernization of the concentration plants at the larger mines has made possible the mining of lower grade ores, so the operations of the three larger producers seems certain for some time to come.

Italian Mines Using Roof Bolts

The method of supporting the back (roof) or other exposed surfaces of underground workings by means of bolts, which is finding extensive application in the United States, has recently been tried in some mines in Italy.

The first tests were carried out in a coal mine of the Sulcis Basin (Sardinia), but, though showing some promise, their application was limited in scope and no regular use has been made. In a lead-zinc mine, also in Sardinia, roof bolting proved unsuitable to the particular conditions.

A more systematic and regular application of roof bolting is taking place both in a pyrite and in a lignite mine in Tuscany. In the first, between the pyrite body and overlying compact masses of anhydrite there are layers of shale in some places. The bolts are used to support these shale layers in wide stopes. Bolts are steel, wedge-type, 1 inch thick and 6 feet 4 inches long. In the lignite mine, two different uses are being tested: in tunnels driven in the seam, the lagging put as a lining around the steel arch sets needed constant replacement; by substituting wooden bolts, placed between the arches in a fan-like pattern, considerable economy seems to be obtained. Support of a tunnel, only by roof bolting, has been tested in a tunnel driven in a conglomerate at the footwall of the seam; so far, results appear satisfactory.

The locally made wooden bolts are 1¾ inches thick and 5 feet 4 inches long. In openings where no other means of support are used, the bolts are placed in pairs with a two-foot-long headboard between each pair of bolts.

It is also worthwhile to report that in an underground marble quarry in the Alps (in the province of Bolzano), a special version of roof bolting has been in use for about 15 years. In the roof of the fairly wide workings, holes 10 feet long are drilled in a square pattern and 6 foot 4 inch long lengths of ¾-inch pipe are inserted in the holes. By means of a hand pump, a cement mortar is injected under pressure through the pipes and expands along fissures in the cap-rock, binding it solidly. To prevent the falling of rock fragments, a wire netting is fixed on the outside ends of the pipes.

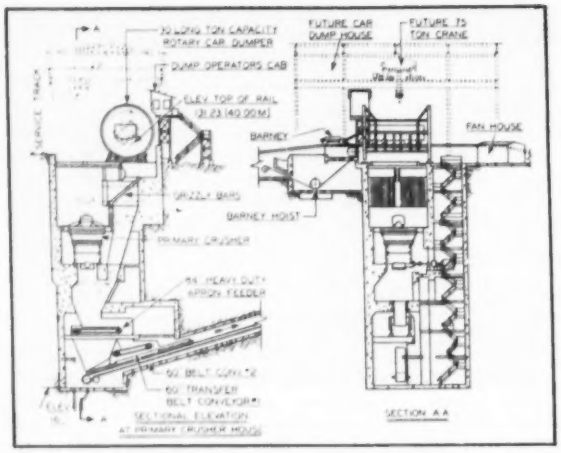


Figure No. 1. The rotary dumper discharges ore to the 60-inch primary gyratory crusher. The storage volume beneath the crusher provides surge for a uniform feed to the conveying system.

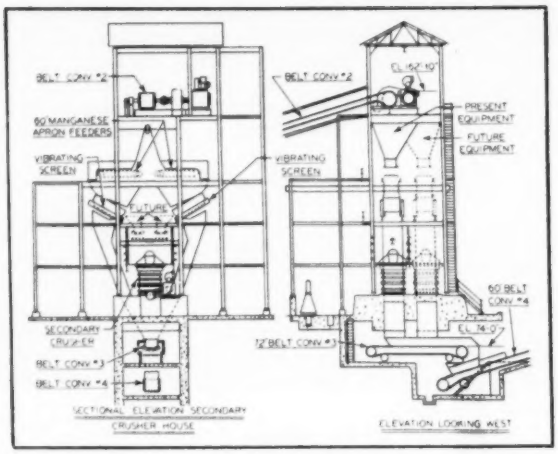


Figure No. 2. The especially designed, secondary, 30- by 70-inch gyratory type crusher produces a final product, 85 percent of which will pass between bars spaced at 5-inch clear openings.

ORINOCO NEARS FIRST SHIPMENT

Venezuela Iron Ore From Cerro Bolivar Mine To Be Crushed And Stored at Puerto Ordaz Plant Starting in Early 1954

The Orinoco Mining Company, a subsidiary of United States Steel Corporation, plans to have its ore handling system at Puerto Ordaz, Venezuela in operation during January 1954. Essentially, the system provides for the unloading of run-of-pit ore from mine cars, crushing and storing it on the ground, and later reclaiming and loading the ore into ocean ships as needed. Details were released in New York City, by L. O. Millard, assistant general sales manager of the Link-Belt Company, designers and constructors of the system.

All components are designed to handle as much as 6,000 gross tons per hour to meet the ultimate requirements of mining and shipping 500,000,000 tons of ore. At the present time, however, only one secondary crusher is being installed and the dumping cycle and apron feeder are adjusted to provide a capacity of 3,000 tons per hour.

The design of the reclaiming and shiploading portion of the system was influenced by future needs as well as physical and climatic conditions. Early shipments will be made largely in Liberties, Victories, and other small ocean vessels. It is anticipated that special carriers of perhaps 40,000 to 50,000 tons capacity will be used for shipping in the future. In order to dispatch these ships quickly and economically, the design provides for two duplicate shiploaders and conveyor lines to load at future peak rates of 12,000 gross tons per hour. The initial installation includes one loader with its conveyor line from reclaim tunnels.

The behavior of the ore had to be considered carefully throughout every stage of the system. Extensive tests by drilling and tunneling indicated that at times the ore might have a tendency to pack and bridge over openings like clay. This was a particularly important factor in the problem of assuring a uniform flow at the unprecedented rate of 6,000 gross tons per hour through hoppers, chutes, and transfers between conveyors. Each of these points was a potential source of difficulty that could result from a build-up or packing of sticky ore when handled at 1.67 tons per second.

Ore from the mine at Cerro Bolivar, 88 miles away, is received in cars having a capacity of 90 gross tons. Each car is uncoupled from the train and drifted individually into a conventional retarder, where it is held until withdrawn by a barney haul. The loaded cars are fed into a single car rotary dumper, and are discharged at the rate of 67 cars per hour. The loaded car bumps the preceding empty car from the dumper and is stopped by track brakes in the dumper. The empty runs by gravity through a kick-back to the empty collecting track.

Crushing And Bedding Ore

From the cars, ore is discharged to a scalping grizzly set with 9-inch openings (Figure No. 1). The oversize flows to a stone box above a 60-inch, heavy-duty, open-bottom gyratory crusher. Undersize from the grizzly joins the minus-9-inch crushed product beneath the crusher, where there is space for about two and one half carloads of ore. This volume provides surge for a uniform feed to the conveying system. Also, the resulting headroom assists in protecting the crusher eccentric.

One feeder is used to withdraw the combined grizzly undersize and the crushed product from a large common outlet. This arrangement provides for a uniform feed to the conveyor system, regardless of wide size fluctuations in the ore. Further-

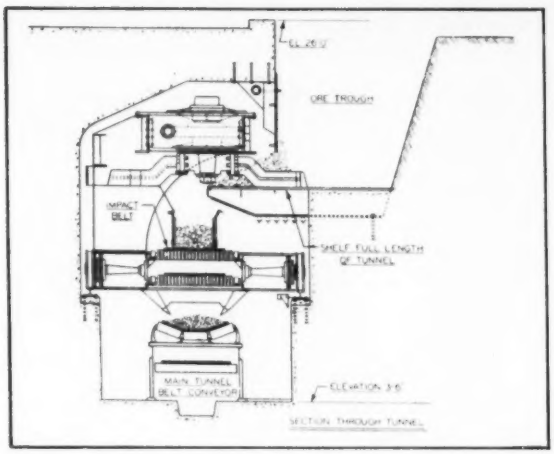


Figure No. 3. Section through loading tunnel under the bedding pile shows how ore is discharged from the shelf by the rotary plow feeder. Impact belt prolongs life of the main tunnel belt conveyor.

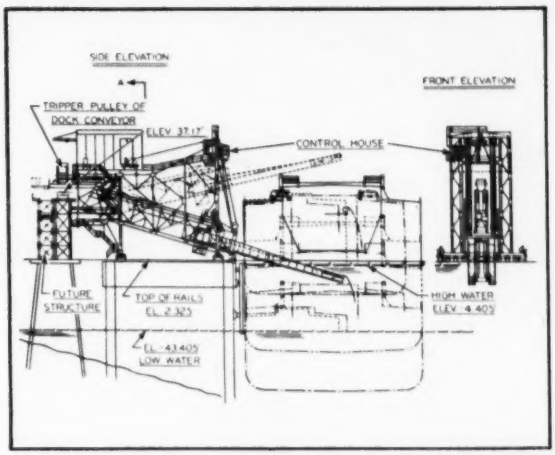


Figure No. 4. Ore can be loaded at either high or low water level by this versatile shiploader. The lower shuttle conveyor may be retracted or extended to trim the hatch of the various sized ships.

more, mixing the crushed product with such sticky ore as may pass through the grizzly should promote flowability and reduce the tendency to bridge over the feed opening.

A system of 60-inch-wide belt conveyors is used to handle ore from the primary crushing station to the secondary and then on to storage at about 600 feet per minute. The main inclined Conveyor No. 2, from primary to secondary, is equipped with a steel cord belt and is driven by a 1,250 horsepower motor. To reduce wear on this expensive belt, a special transfer conveyor was installed beneath the apron feeder. Also, components of the system are protected against damage from tramp iron by a metal detector located near the foot end of Conveyor No. 2.

At the secondary crushing plant (Figure No. 2), the minus-9-inch ore is discharged from Conveyor No. 2 into a surge and distribution chute from which it is fed uniformly by manganese apron feeders to each of the four scalping screens. Oversize from these screens is delivered to opposite sides of the crusher stone boxes for more effective crushing results. Space is provided between the screens for a future shuttle belt on which coarse ore may be withdrawn from the top decks of any or all of the screens.

The secondary crushing plant is designed to produce a final product, 85 percent of which will pass between bars spaced at 5-inch clear openings. Maximum capacity is based on not more than 40 percent of plus-5-inch material passing to the two 30- by 70-inch secondary gyratory crushers.

Space limitations and topography determined the location of conveyors from secondary crushing to storage, as well as the use of a bridge for bedding the ore.

Differ From U. S. Lake Ports

The Orinoco reclaiming and shiploading system is the means for controlling the flow of ore from storage pile to the waiting ships. This function in its simplest form is achieved at the docks of Upper Great Lakes ports, with their large bins or pockets, from which Mesabi ore is chuted directly into the holds of the boats.

At Puerto Ordaz, practically every condition contrasted sharply with those in Duluth or Superior—except the requirement for dependable and fast operation. The system had to be capable of serving nearly every type of ocean vessel, as well as the annual 40-foot rise and fall of the Orinoco River.

A study of the shape and size of the bedding pile indicated that it could be reclaimed most economically by two tunnel conveyors. Minimum shiploading time required assurance of a flow of ore through the tunnel openings that was more positive and dependable than conventional gates and feeders used for free-flowing materials. It was finally decided that flow could be maintained more dependably with a traveling rotary plow type of feeder than with other feeding devices (Figure No. 3).

Use Rotary Plow Feeder

The traveling rotary plow feeder has been used in Germany for many years. It consists of a traveling carriage upon which are mounted horizontally rotating bladed arms which plow the ore from a continuous horizontal shelf into a collecting belt. At Puerto Ordaz, each feeder is equipped with two rotors about 11 feet in diameter. Two feeders serve one conveyor in each tunnel, and together have a normal maximum capacity of 3,000 tons per hour. In an emergency, however, one can feed up to 2,000 tons per hour.

The rotary plow feeder has a number of advantages over other feeding devices for positively assuring a high-capacity loading operation. Some of these advantages are:

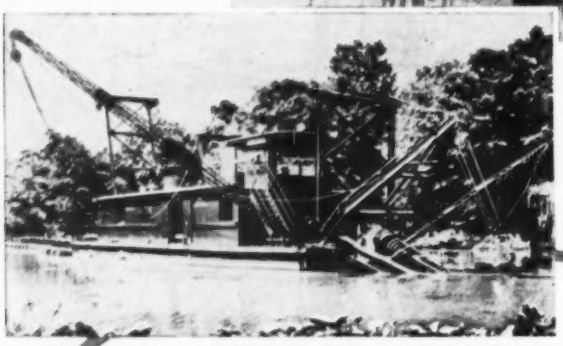
1. Feed opening is continuous for the entire length of each tunnel and provides less support for the arching of ore than would a series of rectangular feed openings of practical size.

2. Arch support is partially undercut by the rotating blades, eliminating costly auxiliary devices required for other types of feeders located beneath rectangular feed openings.

3. Increments of capacity losses are limited to the distance the feeder travels beneath material that has arched solidly above cutting range of the rotor blades. Arching over the openings of other types of feeders usually results in a complete stoppage of flow.

Ore from the two 48-inch-wide tunnel belts is transported by a system of 60-inch-wide belt conveyors to the traveling shiploader. Enroute samples are removed and processed in the sampling plant near the inshore end of the dock, and the

"Indian Lake" dredge, powered by 8 cylinder, 4-cycle Superior Diesel rated at 260 HP.



"Portage Lake" dredge powered by supercharged Superior Diesel developing 450 HP.

weight of ore is recorded by weightometers in the same building.

Versatile Shiploader Needed

The shiploader (Figure No. 4) is of necessity quite versatile to meet the conditions described previously. Ore from the long dock belt is received on a short 60-inch-wide transfer conveyor, from which it is discharged to the upper of two 72-inch-wide conveyors, both of which are mounted on a common pivoted boom. The lower shuttle conveyor may be extended to trim the hatch of the largest vessel or retracted to clear the face of the dock. The boom may be raised and lowered through an arc suitable for loading small ships at low water or the largest anticipated carriers at the 40-foot higher water level.

D.C. Saves Start-Stop Time

As stated previously, the rotary plow feeders were adopted to provide the most dependable feed to the belt conveyor system. The use of direct current for the entire reclaiming system provided the most satisfactory solution to the other problems. It enabled all the units to be tied together electrically throughout the entire speed range and under the control of the shiploader operator. Thus, it reduced the cumulative time delays resulting from starting and stopping the various units in sequence. Sequence control is necessary with the use of alternating current, and the loss of time for each start-stop or slowdown would have been appreciable.

However, the direct current hook-up required special consideration for this relatively long and heavily loaded system of belt conveyors. When two or more consecutive belts are started simultaneously, the speed of the foot end of the leading belt is less than the speed of the belt over the head pulley of the preceding conveyor. This is due to the stretch of standard fabric belts resulting from the accelerating stresses. Obviously, until the two belts reach the same speed, the leading belt receives more than its normal cross-sectional load of material from the preceding higher speed belt, and spillage may result. To overcome this, steel cord type of belts were used in the reclaiming system as they provide minimum stretch within the design limits.

When the plant goes into operation, the ore handling system will play a most important part in making Cerro Bolivar iron ore available to the blast furnaces of the United States and the world.

Anaconda officers, federal and state officials, armed services representatives, and members of the clergy who took part in the formal opening of the Yerington plant. From left to right, they are: Colonel Floyd A. Rutherford, Nevada Military District; Chester H. Steele, vice president in charge of western operations of the Anaconda Copper Mining Company, Butte, Montana; Robert E. Dwyer, president of Anaconda, New York, New York; United States Senator Patrick McCarran, Nevada; Albert E. Millar, general manager of Anaconda's Yerington operations; Nevada Governor Charles Russell; United States Senator George Malone, Nevada; Clyde E. Weed, Anaconda vice president in charge of all Anaconda operations, New York, New York; Reverend Bill Lynn, Yerington Community Methodist Church; Father Florence Flahive, Yerington Holy Family Church; and Captain Floyd A. Rutherford, officer in charge United States Naval Ammunition Depot, Hawthorne, Nevada.

First Copper From Yerington

Anaconda Copper Mining Company started its new Yerington, Nevada copper plant right on schedule on November 10th. This is a significant achievement and auspicious occasion for Anaconda as it marks the first post-Korean War plant brought into production to augment domestic copper output.

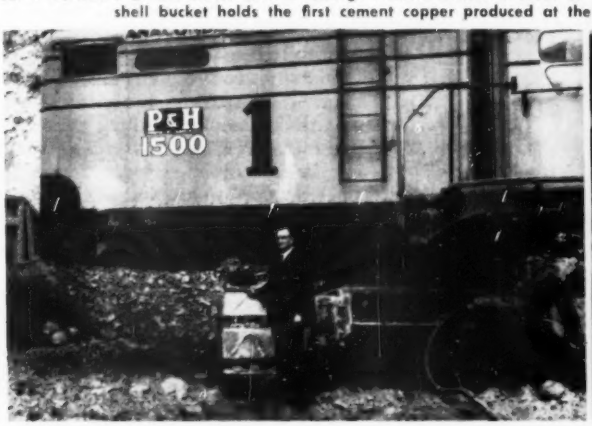
Anaconda explored the oxide ore deposit in the early 1940's but deferred production until the federal government asked the company to develop the mine and build a plant. In November 1951 the company signed a contract with the government for production from the oxide deposit. Anaconda has expended over $32,000,000 of its own funds on the project.

An open-pit mine has been developed, 15,000,000 tons of waste stripped, and 1,700,000 tons of ore stockpiled in the last 16 months. Construction of the 11,000-ton-per-day crushing plant, leaching tanks, precipitation vats, and a complete sulphur-ore-to-sulphuric-acid plant was carried out while the pit was developed.

The Yerington project is an Anaconda project. Exploration was under the geological department headed by Reno H. Sales and Vincent D. Perry. Alex McDonald served as field engineer. The company's metallurgical department, headed by Frederick Laist, developed a process to use the low-grade sulphur ore from the Leviathan mine in California to produce sulphuric acid necessary for leaching of the copper oxides. Frederick F. Frick was in charge of all metallurgical testing. The plant was designed by the New York engineering department under the supervision of Wilbur Jurden.

Albert E. Millar, who has been a long-time Anaconda employee with services at Chuquicamata, Chile, Cananea, Mexico, and Inspiration, Arizona, is manager of operations and has supervised all work at Yerington.

LEFT: Nevada's United States Senator George Malone stands in front of one of the 5-yard electric shovels in the new open pit. RIGHT: This clam shell bucket holds the first cement copper produced at the Yerington plant. Precipitation launders are at the right.



Mine, 100-ton-per-day gravity-flotation mill, and camp of Kennametal's Nevada Scheelite Division near Rawhide, Mineral County, Nevada.

Kennametal Develops Nevada Mine To Assure Adequate Source of Tungsten

Another step toward completely integrating production of both tungsten and titanium carbide in all stages from ore to finished tools and wear-parts has recently been taken by Kennametal Inc., of Latrobe, Pennsylvania. The firm now operates tungsten mines in Nevada and California and has completed a tungsten refining plant at Port Coquitlam, British Columbia.

Since its beginning in 1938, all of Kennametal's efforts have been devoted toward the final stages of its manufacture of metal-cutting tools and wear-resistant parts from material invented by the president, Philip M. McKenna. It is not surprising that the company has now included production of its own raw materials. This is particularly true because Mr. McKenna's first manufacturing experience was in refining tungsten during World War I when he managed the Chemical Products Company of Washington, D.C., which produced over 40 percent of all ferro-tungsten then used in the United States. His family was instrumental in the development of the Wolf Tongue Mining Company in Nederland, Colorado, a large producer of tungsten ores at that time.

Nevada Mine Selected

During the past few years many reports were submitted to Kennametal regarding western tungsten mines. After carefully examining these reports the company decided to make a thorough examination of Nevada Scheelite, Inc.'s property, located about 5 miles from the old gold boom town of Rawhide, Mineral County, Nevada.

In January of 1951, Philip and Donald McKenna, president and vice president respectively, met with a small party of mining engineers and geologists at the Nevada Scheelite mine. From their examination it was decided to enter into negotiations with the owners for the property's purchase. Principal owner of the old company had passed away and this, along with the low price of tungsten which had been in effect for several years, left the company none too prosperous. The mine had a very good production record for over 12 years, having produced more than 100,000 units of WO_3 from ore averaging 1.25 percent WO_3, with recovery of 0.83 percent WO_3 per ton of ore. There were also two large tailing piles with over 100,000 tons of tailings assaying almost 0.50 percent WO_3 per ton. After several months of negotiations the property was turned over to Kennametal Inc. on July 1, 1951.

Geological Prospecting Pays

This deposit is a typical contact metamorphic one with the ore occurring in tactile in the limestone beds along their contact with granite. The mineralized zones have been highly faulted and the ore bodies themselves are usually quite soft; this makes for a high mining cost as the ground has to be supported by square set timbers. After a few floors have been mined, waste filling is introduced.

When purchase negotiations were started, the mine had only been developed to the 300-foot level and ore body walls had not been test drilled to any extent to seek other mineralized zones. So a Chicago-Pneumatic No. 55 air-driven diamond drill was purchased and an extensive diamond drilling program laid out. Over 10,000 feet of drilling has been completed with this drill and several unknown ore bodies have been discovered. A recently purchased Chicago-Pneumatic No. 8 gasoline engine-powered diamond drill is used for surface drilling.

Mining And Testing

The mine is developed through a three-compartment vertical shaft with two hoisting compartments and

a manway containing air, water, and electricity conductors. The shaft has been extended, a pocket cut below the 400-foot level and crosscutting has been carried out to an ore body north of the shaft. Ore is hoisted in two-ton skips hung below the cages.

Two Eimco 12-B's and one Sullivan mucking machine are used in headings and for loading ore broken when new stopes are started. Two Mancha trammers are used for hauling ore cars from the stopes to the skip pockets. These pockets hold from 100 to 200 tons of ore and feed directly to the skips with loading control by air-operated chute gates.

Several different types of air drills are used and in hard ground Kennametal cemented tungsten carbide bits are used. In certain ground Kennametal rotary bits have been used with the diamond drill.

With several different types of ground in the mine, the Kennametal organization has been able to thoroughly test any new type of bit or bit change the laboratory has developed.

Raise Mill Capacity To 100 Tons

Under the former ownership, mill capacity was only 40 tons per day, so plans were formulated to increase capacity to 100 tons per day of mine ore and to remill an additional 50 tons of old tailing. It was also desired to keep the plant working during mill expansion. This was effected with only a few production days lost at the final change. The present mill has since handled 165 tons per day with no touble.

As the old mill contained no grinding unit, all concentration was done by tabling. Since other tungsten operators in the state had been successful in stepping up recovery by adding flotation to their flow sheets, it was decided to make flotation tests. Otto Brown, American Cyanamid Company's field engineer, ran tests on finely ground ore. These showed that a profitable amount of tungsten could be recovered by flotation. Tests were next conducted on the old tailing pile at the present mill site but were not too successful. Mr. Brown and Irvin S. Thyle of Western Machinery Company had just completed test work at the Del Monte, California, beach sand plant, of the Del Monte Sand Company where they developed a new type of scrubber, known as an attrition cell, which has rubber covered impellers with a pulp having 85 to 87 percent solids. This pulp scrubs itself as the sand particles rub against each other to remove any film of impurities. After small scale testing yielded satisfactory results which gave a substantially increased recovery three large units were purchased and installed in the new mill section.

Table And Float

A 5 by 10-foot Straub ball mill, with two 5 by 5-foot mills joined together with grates for each mill section, was purchased. As the mill has two separate units, it is fed at each end and a different feed is ground in each section. In the Nevada Scheelite installation one section of the mill grinds the crushed mine ore while the other section grinds tailing and middling sands from the tables. Four-inch balls are used for mine ore and 2 or 2½-inch balls for sand grinding. The mill is a low-discharge type so sliming is held at a minimum. Two new Deister diagonal-deck tables were added to the mill's table section where the coarse scheelite is recovered. At the present time 77 percent of the finished concentrate is from tables and 23 percent from flotation. Table concentrates assay approximately 70 percent WO_3.

Some of the ore is quite high in iron sulphides, which interfere with good table operation and preclude a clean scheelite concentrate. It was found by test work that a large percentage of the sulphides could be removed by flotation, so three 42-inch Fagergren cells were placed at the head of the flotation circuit and have proved highly successful. Four smaller Fagergren flotation cells operate in the tungsten flotation circuit and produce a rougher concentrate which is further treated in four Denver "Sub-A" cells arranged for triple cleaning. A grade of over 50 percent WO_3 has been made, but by producing a product in the 20 to 30 percent range a good market price is secured and extraction percentage increased. The cleaned tungsten flotation product flows to a dewatering cone and is drawn off at the end of each shift onto pan-type vacuum dryers, where it is further dewatered before sacking and shipping.

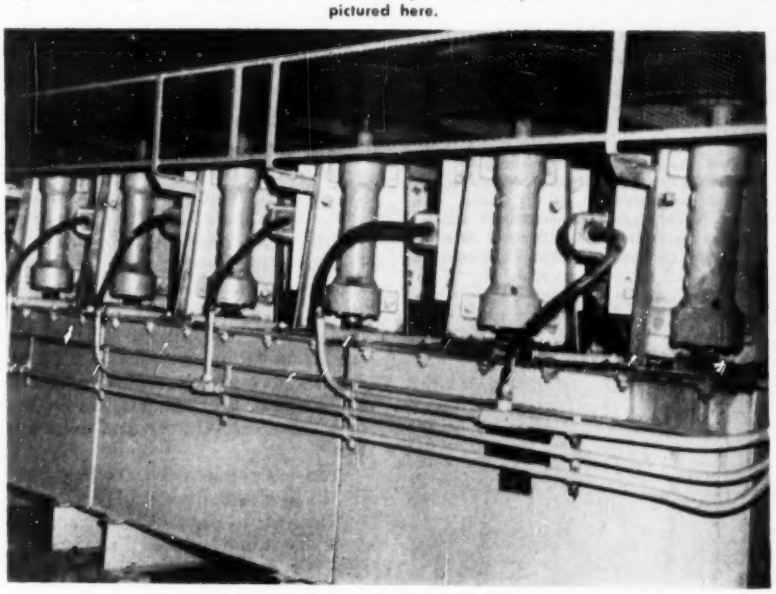
Power, Water, Mine Camp

Power is a problem at the mine, as it is located 30 miles from the nearest line source. Three slow speed 140-horsepower Chicago-Pneumatic Diesel engines and a Caterpillar D-17000 diesel engine were added to the power plant, which previously consisted of two Caterpillar D-17000 and three Caterpillar D-13000 Diesel engines all directly connected to 440-volt generators.

Two old wells on the property didn't have enough capacity to supply water needed for increased production, so a new well was drilled during the summer of 1951. Even during the driest part of the year it has shown very little change in water table. As the well is about four miles distant and 1,000 feet lower than the point of use, water is pumped in three stages with 20,000-gallon storage tanks located at each pumping unit. The four-inch

(*Continued on page* 103)

Flotation recovery of scheelite has been materially increased by the Wemco attrition machine pictured here.



SUCCESSFUL SMALL MINE

SISKON CORPORATION OPENS CALIFORNIA'S NEWEST GOLD MINE

ABOVE: The Tennessee ore body with roads and bulldozer trenches. BELOW: The new cyanide mill. Diesel fuel storage tank in foreground and thickener in background.

Believe it or not, California has a new lode gold producer—the Siskon Corporation. Operations are located in the extreme western part of Siskiyou County southwest of Happy Camp and 115 miles southwest of Yreka, the nearest accessible railroad point.

The first unit of a 250-ton mill was placed in operation on September 23. Present capacity is around 110 tons a day.

The discovery of the Siskon mine can be credited to Hugh Wright, an experienced geologist, and Al Stewart, a veteran prospector, in Wright's employ.

Pictured at the Siskon cyanide plant from left to right: are: Hubert B. Chessher, Jr., general superintendent; H. L. Hazen, well-known Nevada cyanide metallurgist and corporation director; and Otto Brown, American Cyanamid Company metallurgist. Hazen designed the Siskon cyanide plant.

The Siskon is a wide, shear zone and gossan capping on the upper slopes of Tennessee and Florida Mountains on the west side of Dillon Creek. The mineralized zone is 100 to 125 feet wide and has been traced for a distance of several thousand feet. The mineralization is on a contact between the metamorphic sedimentaries and the metamorphic volcanics. Along the main mineralization, the footwall is greenstone and the hanging wall phyllite. The main shear zone is along the contact between the two.

Ore has been developed at both ends of the 2,000-foot-long zone between Tennessee and Florida Mountains, with indications that mineralization may be continuous for the entire distance between the two workings. No barren hole or bull dozer cut has yet been made on the main shear system.

The elevation is 3,809 feet at the Tennessee workings and 3,487 feet at the Florida. The camp and mill are at 2,200 feet. Winters are mild but wet.

Approximately $400,000 has been spent in developing and equipping the Siskon to date. Aside from the ordinary mine buildings, such as office, bunkhouses, dining and recreation halls, the buildings include the first 100- to 125-ton unit of a 250-ton mill which was placed in operation on September 23. H. L. Hazen, one of the corporation's directors, designed the flowsheet.

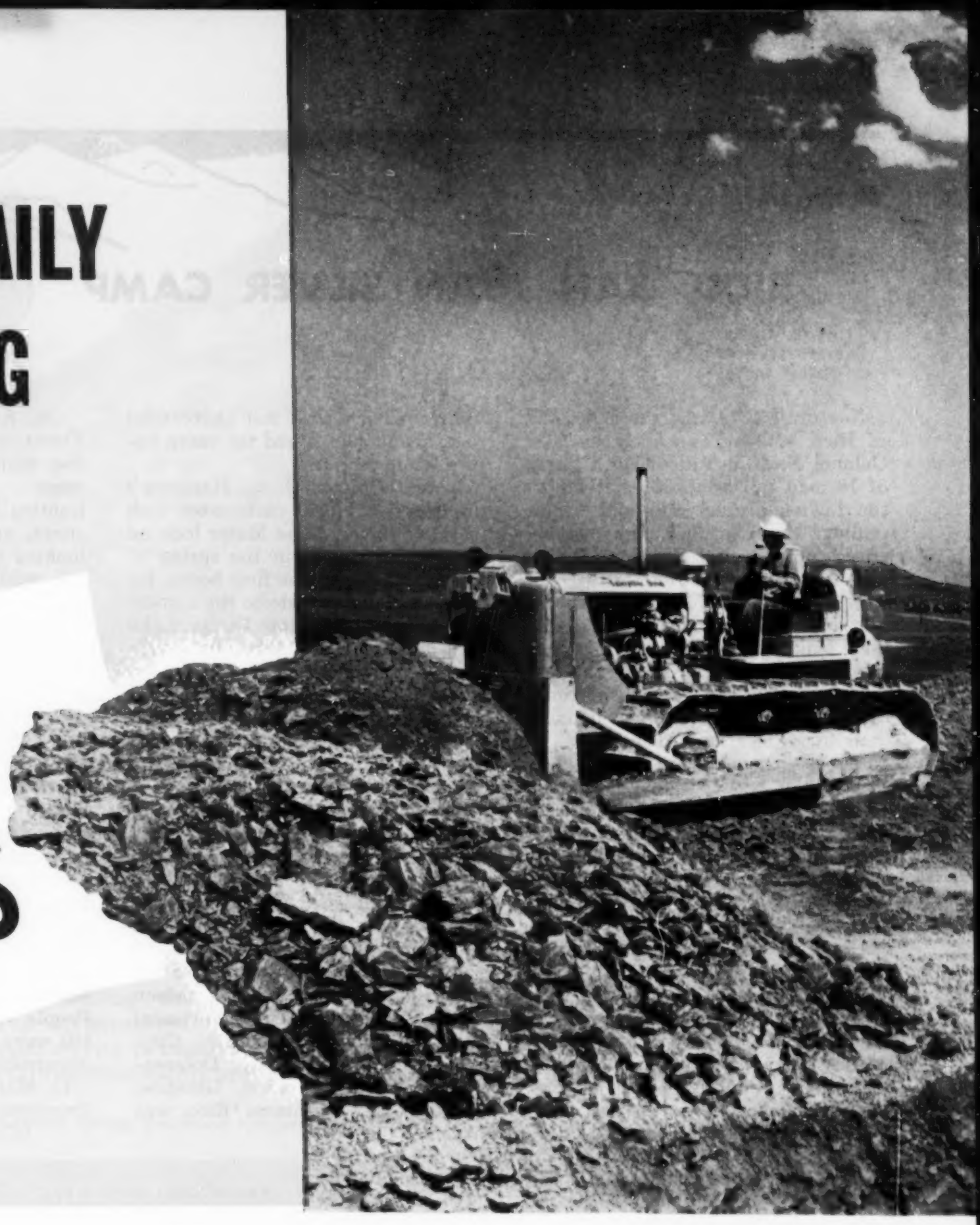
Power is supplied by Diesels. The plant includes three Palmer International, Self-Regulating, 240-volt alternators of 75 kilowatts each, and one 100-kilowatt Hercules. The company plans eventually to install its own hydroelectric plant. The cyanide mill has two thickeners and three agitators. A 35-mesh grind is used.

Some 4,000 tons of ore are being stockpiled on a small bench above the mill to supply mill feed through the winter. This stockpiling is being done by contract.

One of the most attractive features of the Siskon is that it is an open-pit operation. Consequently, mine and mill costs, including royalties, are expected to be from $6.00 to $7.00 a ton. In addition to gold, the ore carries about one-half of one percent copper and less than an ounce of silver to the ton.

H. B. Chessher of Reno is president of the Siskon Corporation; E. J. Schrader, mining engineer, vice president; and H. B. Chessher, Jr., mining engineer, general superintendent. About 30 men are employed on the property.

ITS DAILY 'DOZING IS 1200 TONS



That's a big load on the blade of this Caterpillar D7 Tractor. The husky yellow unit handles 1200 tons of Bentonite clay every 10-hour day on the stockpile of American Colloid Co.'s reducing plant near Belle Fourche, South Dakota.

"We're very pleased with our D7 and 'dozer," says Edwin Busfield, plant superintendent. "It stands up very well and is economical to operate. We also receive very good parts and repair service."

Big, high-profit loads are a cinch for the D7 with matching bulldozer. Its Caterpillar-built Diesel Engine develops maximum torque when it's under load. The machine won't smother down, will deliver power *when* you want it. The 'dozer's scientifically curved moldboard means that loads are *rolled*, not pushed, so you can handle more material at higher speeds. The Cat* D7 Tractor is built to stay on the job for years to come, with a minimum of costly down time. Tractor and 'dozer stand up to equipment-busting rock, thanks to their extra-rugged construction and long-wearing high-strength steels.

Your Caterpillar Dealer sells a wide range of tractors and bulldozers. He will arrange a practical, on-the-job demonstration of the tough Caterpillar-built team that suits *your* job. And remember, you can rely on him for fast, skilled service and genuine factory parts.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill.

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Muriel Sibell Wolle Describes

RICO, SAN JUAN SILVER CAMP

Not until 1879 was there a town of Rico, although as early as 1886 Colonel Nash, a Texan, led a party of 18 men up the Dolores River to the town's present site and began mining. Next, in 1869, two experienced prospectors, Sheldon Shafer and Joe Fearheiler left Santa Fe, New Mexico for Montana, resolving that nothing could stop them on their way but the discovery of mineral. On their journey they covered the same territory as Nash, relocated most of his findings, naming their first location (discovered in July) the Pioneer. Their next discovery, the Nigger Baby, northeast of the present town, was so named on account of the large amounts of black oxides of manganese found in the outcroppings and mistaken for sulphurets of silver.

In the summer of 1870, R. C. Darling, while surveying the southern and western boundary lines of Colorado, pushed up the Dolores River and ran across Shafer and Fearheiler developing their claim. Darling stopped for a couple of days to gopher around and opened the Atlantic Cable lode on the east side of the river. By this time, other prospectors who had joined Shafer and Fearheiler, had discovered the Aztec and Columbus lodes on Expectation Mountain and the Phoenix on Nigger Baby Hill. All the men went out in the fall, the original prospectors heading for Fort Defiance, Arizona. On the way they were attacked by Indians; Fearheiler was killed and although Shafer escaped, he never returned.

In 1871 no mining was done in the area, but during the year, Darling interested some United States army officers and two or three capitalists in the mines and got them to outfit a party to prospect the area more thoroughly. In July 1872, he set out from Santa Fe, bringing with him a party of men, mostly Mexicans, who not only located several properties but built a small adobe smelter in which to refine their ores. With ore from the Atlantic Cable, Aztec and Yellow Jacket mines, the men produced three bars of base bullion; but as their furnace was not successful they abandoned it and the camp before winter set in.

It was Colonel J. C. Haggerty's discovery of lead carbonates rich in silver in the Alma Mater lode on Nigger Baby Hill, in the spring of 1879, that started the first boom. By summer the stampede to the district was on, as miners from Ouray, Lake City, Silverton, Ophir, and San Miguel rushed in and began to dig. Quantities of rich oxidized silver were uncovered and a small amount of "ore found in chestnut veins on Newman Hill" was shipped to Swansea, Wales for treatment.

After Senator John P. Jones of Nevada and other capitalists purchased eight mining claims on Nigger Baby Hill for $100,000, there was no doubt as to the value of the properties in the district and the next step was to lay out a town. So many names were suggested for the camp that a committee was chosen to select one. From an assortment which included Carbonate City, Dolores City, Lead City, Doloresville, Belford, Patterson, Glasgow, and Lovejoy, the name Rico was chosen.

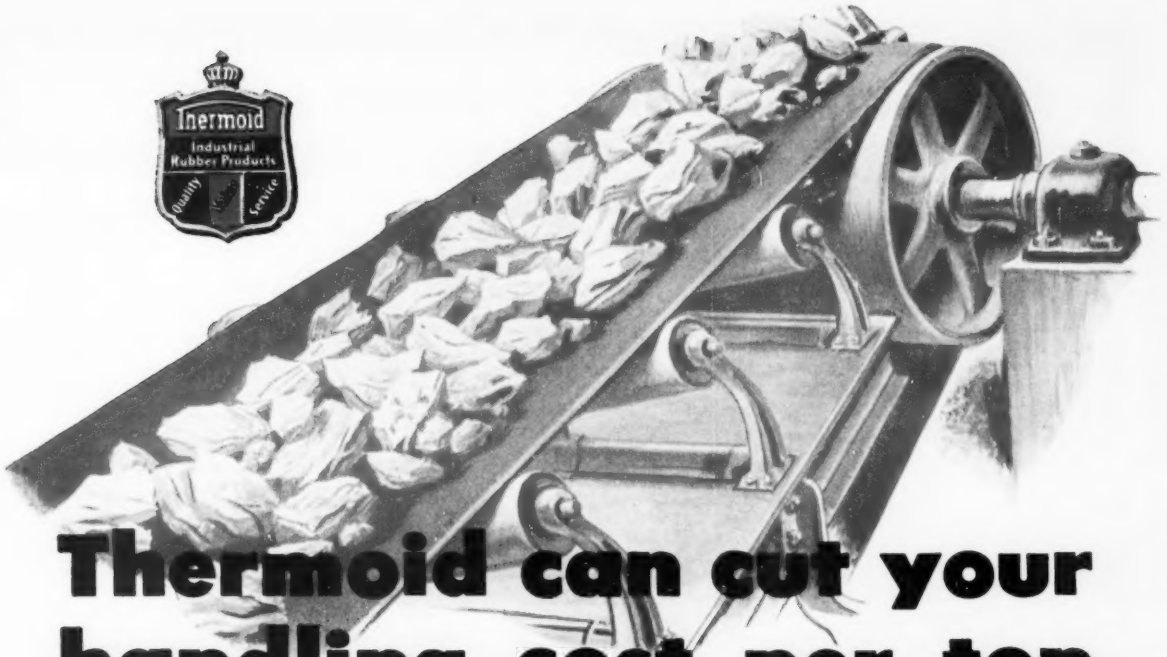
On August 16, 1879 the *Ouray Times* commented: "The town is in the midst of the greatest excitement. . . . Men are coming in and hunting locations for stores, whisky shops, meat shops, and one man is looking for a brewery site. . . . All are wild as March hares over the prospect of having another Leadville in a few days. Already we have a milk ranch. . . . Machinery is on the way for two smelters, and two sawmills will be turning out lumber in less than six weeks."

By September, the first issue of the Rico *News* had been printed, a postoffice had been established, and within a month 29 buildings, 7 saloons and 4 assay offices jostled the tents and log cabins of the miners. Jim McJenkins' sawmill, which was being freighted to the camp, was only 16 miles away on the crowded road. Upon its arrival, with the first freight shipment to reach Rico, it was set up 3 miles above the town. People continued to pour in until 600 were milling around the barely discernible streets.

In March 1880, Richard Gentry, President of the Grandview Mining

(*Continued on page* 84)

Atlantic Cable Mine in Rico, Colorado



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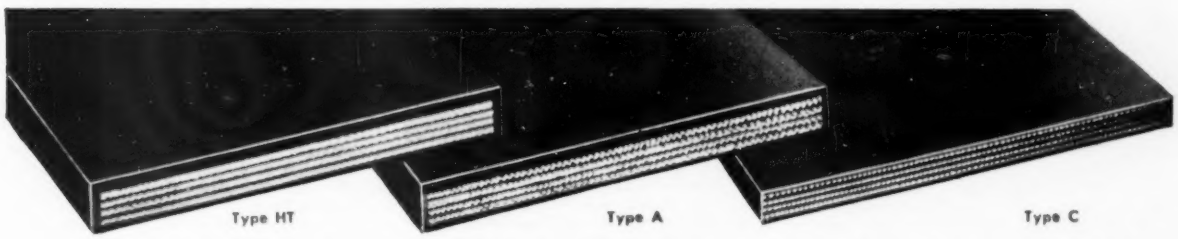

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ACTIVITIES OF U. S. MINING MEN

GORDON I. GOULD has resigned as president and director of the New Idria Mining and Chemical Companies of California and Honduras to devote full time to consulting mining engineering work for Gordon I. Gould and Company, a mine consulting and operating firm with headquarters in San Francisco, California.

Harlan A. Walker is now the general manager of the Marcona Mining Company with headquarters in Lima, Peru. For many years he was assisant general manager of the Homestake Mining Company and more recently was a consulting engineer with headquarters in Salt Lake City, Utah. Marcona has developed and is operating a large open pit iron mine near the sea coast in southern Peru. First shipment of iron to east coast United States steel mills was made earlier this year. Marcona is a subsidiary of Utah Construction Company and Cyprus Mines Corporation.

John W. Kenney, Jr., has been appointed plant manager of Eagle-Picher Company's diatomaceous earth operations at Clark, Nevada. Mr. Kenney succeeds **Thomas A. Copeland** who resigned to devote full time to private interests.

Charles Steen, chief geologist for the Utex Exploration Company, has been nominated by the Grand Junction, Colorado Junior Chamber of Commerce as one of the 10 outstanding young men in America. Mr. Steen prospected the Big Indian Canyon area near Moab, Utah and discovered rich uranium ore bodies.

F. J. Haller, former manager of Michigan mines for the Cleveland-Cliffs Iron Company has been appointed vice president of operations for the North Range Mining Company. **J. W. Westwater** of Ishpeming, Michigan will succeed Mr. Haller. **Hugo Korpinen** has been promoted from superintendent of Cleveland-Cliffs Mather mine to district superintendent of the Michigan underground mines and **H. C. Swanson** has been promoted from superintendent of the company's Republic and Humbolt mines to district superintendent of Michigan open pit mines.

Virgil A. Bilyeu has been named mine superintendent of the Utex Uranium Company's properties. Mr. Bilyeu has been mine foreman at United States Vanadium Corporation's Rifle, Colorado property.

W. A. Knoll has been appointed to a six-year term as a member of the board of control of the Michigan College of Mining and Technology at Houghton, Michigan. Mr. Knoll, genral superintendent of Pickands Mather and Co.'s iron ore operations on the Gogebic range, succeeds **F. A. Flodin** of Iron Mountain, Michigan.

Elwood I. Lentz, assistant production manager of the Stauffer Chemical Company's San Francisco division, has been named plant manager for the new $5,000,000 phosphate processing plant of Western Phosphates, Inc. at Garfield, Utah. Western Phosphates is a partnership composed of Kennecott Copper Corporation, American Smelting and Refining Company, and Stauffer Chemical Company. Other Western Phosphate officials include: **Victor Laughlin** of Salt Lake City, controller; **George A. Reid** of Tacoma, Washington, production superintendent; and **James A. Malloch** of Berkeley, California, maintenance superintendent.

A. W. Gerhardt has joined the staff of the Jaquays Mining Company of Globe, Arizona which mines and mills asbestos. For the last two years Mr. Gerhardt has been superintendent of Abril mine near Tombstone, Arizona.

Jack Hesler, former safety engineer for the Potash Company of America in Carlsbad, New Mexico has been named mine development engineer. **Bob Billings,** former assistant safety engineer was promoted to fill Mr. Hesler's former position, and **Lee Shultz** has been appointed assistant safety engineer.

DeWitt L. Morris has been appointed superintendent of Freeport Sulphur Company's new mining plant at Garden Island Bay in Louisiana. Mr. Morris has been with Freeport since 1937.

SHELDON P. FAY, right, President of the U. S. Pumice Supply Company, recently discussed the Regan, Hope and D'Ewart Bills at a meeting of the Mining Association of the Southwest in Los Angeles, California. The bills, now before Congress, will regulate filing of mining claims. Shown with Mr. Fay is JOHN H. EGGERS, president of the association. According to Mr. Fay, the Regan Bill would require the prospector to apply at the nearest Department of Interior office for a lease instead of at a nearby county seat. His application would have to contain a legal description of the property which would be expensive and difficult to obtain. Mr. Fay also stated that the prospector may lose his claim while waiting for action on his application. The Hope Bill, Mr. Fay felt, could destroy placer and other surface mining by added restrictions about soil erosion control, surface restoration, and water pollution. Mr. Fay feels that the D'Ewart Bill, although restrictive, would correct some claim filing abuses and would control use of timber and other surface resources by the claimants.

E. C. WEICHEL, JR., former plant superintendent of the Trail Ridge ilmenite mine of the Humphreys Gold Corporation, has been appointed manager of both the Trail Ridge plant and Humphrey's new Highland plant which is under construction at Lawtey, Florida. W. J. SIPRELLE has been named to succeed Mr. Weichel as plant superintendent of the Trail Ridge mine which is near Starke, Florida. The Highland plant at Lawtey, like the Trail Ridge plant, will be constructed and operated by the Humphreys firm for E. I. du Pont de Nemours & Company of Wilmington, Delaware.

Paul L. Bybee, former production supperintendent at Freeport's Hoskins Mound mine in Texas will assume the same duties at Garden Island Bay.

John J. Forbes who has been with the United States Bureau of Mines for 39 years and is now Director, has been elected an honorary member of the American Society of Safety Engineers. Honorary memberships are given in recognition of outstanding achievement in safety engineering or related fields.

Paul H. Hunt, director and consultant for the United Park City Mines Company of Salt Lake City, Utah, has been appointed to the three-man United States Bureau of Land Management Survey Team which will make recommendations for re-writing the procedures and methods used by the Bureau in handling cases which involve public lands.

Allen Goodrich, design engineer at the Nashwauk, Minnesota offices of the Cleveland-Cliffs Iron Company, is now at the firm's offices at Ishpeming, Michigan.

Mrs. Anne M. Logsdon of Spokane, Washington has been elected president of the Prospectors and Mine Owners' Association to succeed the late **A. A. Elmore** of Wenatchee, Washington. **Frank Lilly** retains his position as executive secretary. The nonprofit association is made up of councils throughout the Northwest, including Alaska and northern California. It acts in a liaison capacity between its members and the United States Congress.

Wayne W. Beebe has been appointed superintendent of the Plummer mine on the Mesabi Range in Minnesota. The Plummer is operated by the United States Steel Company's Oliver Iron Mining Division.

Major General K. D. Nichols, wartime district engineer of the Manhattan Project, has been named as General Manager of the U. S. Atomic Energy Commission. He replaces **Marion W. Boyer** who has resigned to return to his post as vice president of Standard Oil Company of New Jersey.

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THE COLORADO FUEL AND IRON CORPORATION

Dr. Herbert H. Lang has joined the faculty of the New Mexico Institute of Mining and Technology at Socorro. He will be an assistant professor in the Department of Humanities.

W. Howard Winn has been appointed superintendent of the Hurley, New Mexico smelter of the Chino Mines Division of Kennecott Copper Corporation. **Wesley Dow** will be assistant smelter superintendent. Mr. Winn succeeds **E. A. Slover** who was recently named assistant general manager of the Chino Mines Division.

Walter J. Logus will serve as president and director of the Vindicator Silver-Lead Mining Company for the coming year. Other officers of the Idaho firm are **Mrs. A. M. Logsdon** of Spokane, vice-president and director; **John T. Dalton** of Seattle, **Herman J. Rossie** and **Dr. F. E. Scott**, both of Wallace, Idaho, directors. **H. F. Magnuson** of Wallace has been reappointed secretary-treasurer.

P. V. Burgett, eastern district chief mining engineer for the Oliver Iron Mining Division of the United States Steel Corporation, retired recently after 33 years of service. **John T. Nolan**, formerly assistant district chief engineer, has replaced Mr. Burgett.

A. L. Johnson, former superintendent of the Cary mine at Ironwood, Michigan, has moved to the Duluth, Minnesota office of Pickands Mather & Co. as an operating assistant. **John C. Wangaard** succeeds Mr. Johnson as superintendent of the Cary mine.

DR. WILLIAM E. WRATHER, director of the United States Geological Survey, has been awarded the John Fritz Medal for notable scientific achievement. Under Dr. Wrather's leadership, the USGS has received world-wide renown for its special services to other government agencies and for its geological surveys. Dr. Wrather is a past president of the American Institute of Mining and Metallurgical Engineers.

James Boyd of the Kennecott Copper Corporation has been named chairman of a permanent advisory group for the National Science Foundation. The group will develop policy on basic research in mineral exploration and discovery. Other panel members include: **Arthur H. Bunker**, president of the Climax Molybdenum Company, New York; **John Gustafson** of the M. A. Hanna Company, Cleveland, Ohio; **Thomas Nolan** of the U. S. Geological Survey, Washington, D. C.; **John Vanderwilt** of the Colorado School of Mines, Golden Colorado; **Clyde E. Williams** of the Battelle Memorial Institute, Columbus, Ohio; **Dr. William Wrather** of the United States Geological Survey, Washington, D. C.; and **Paul Zinner** of the U. S. Bureau of Mines, Washington D. C.

Grover E. LeVeque has retired from his position as manager of the Minnesota Ore Division of the Jones & Laughlin Steel Corporation although he will continue in a consulting capacity. **Harry F. Kullberg**, general superintendent, will succeed Mr. LeVeque as manager.

Dr. W. C. Schroeder has resigned his post as assistant director of the U. S. Bureau of Mines. He will be teaching chemical engineering at the University of Maryland.

J. J. Brunner, who formerly worked for the Nickel Processing Corporation, Nicaro, Oriente, Cuba, is now a mineral dressing engineer at the Massachusetts Institute of Technology.

Benjamin M. Gozon has been appointed Mines Director of the Philippine Islands succeeding **Demetrio Andres**. Mr. Gozon has been a professor of mining laws at the University of the Philippines and at San Beda Law College.

G. V. R. Richdale has resigned his seat on the board of directors of General Exploration Orange Free State, Limited, and **P. H. Anderson** has been appointed to fill the vacancy created by Mr. Richdale's resignation.

OBITUARIES

George P. Goodlier, a native of Denver, Colorado and superintendent of the Paracale-Gumaus Consolidated Mining Company of N. Camarines, Philippine Islands, recently died at the age of 53. Mr. Goodlier owned a manganese mine in Silver City, New Mexico.

L. Webster Wickes died on September 16 at his home in Los Angeles, California. He was a director and treasurer of the Cyprus Mines Corporation whose executive offices are in Los Angeles.

ACTIVITIES OF INTERNATIONAL MINING MEN

SIR DIGBY V. BURNETT has been elected president of the Southern Rhodesian Local Association of the Institution of Mining and Metallurgy. A consulting mining engineer, Sir Digby Burnett is a leading figure in the Rhodesian mining world. He is a director of the Cam & Motor Gold Mining Company, The Sherwood Starr Gold Mining Company, Olympus Consolidated Mines Ltd., Falcon Mines Ltd., Rezende Mines Ltd., Divide Chrome Mines Ltd., and other companies.

Herbert P. Dickey, vice president and general manager of Dominion Wabana Ore Limited of Wabana, Newfoundland, Canada recently visited the Mesabi Range. Mr. Dickey studied HMS installations as his company is considering possible installation of a similar unit at its mine.

G. J. Brittingham is doing consulting metallurgical engineering work with headquarters at 50 River Road, Greenwich, New South Wales.

Barney Foust has been appointed chief metallurgist of the Mines Division of Marsman & Company with headquarters in Manila, Philippine Islands. He fills the position recently vacated by **Clarence Weekly.**

John Rhynd has been appointed Secretary of the English Commonwealth Development Finance Company which will lend money for Commonwealth resource development, including the metal industry.

Allan Christinsen, vice president of the Utah Construction Company, returned recently to his San Francisco headquarters after a two-week inspection trip to the Marcona Mining Company's iron ore mine on the west coast of Peru. Ore from the mine, operated by Utah Construction, is shipped to the United States.

V. Gorsky, consulting engineer and metallurgist, is now doing research work in the geological department of the Natal University in Durban, South Africa.

Dr. G. Bloot, formerly assistant in the mining department of the university at Delft, Holland, is now an economic geologist for the Liberian government. He is with the Bureau of Mines and Geology in Monrovia.

JOHN E. KELLY, consultant in natural resources with headquarters in Washington, D. C., is spending six weeks in Spain. While there he is negotiating for large-scale, long term natural resource exchange. His Spanish headquarters are in the Hotel Hilton Castellana.

M. Lemne, president of the Bank of Sweden, has been appointed a deputy member of the board of directors of the Trafik AB Grangesberg-Oxelosund. He replaces **Dag Hammarskjold,** now Secretary General of the United Nations.

A. N. Robertson of Grass Valley, California; **A. J. Roberts** of Matlock, England; and **C. A. Weslerdahl** of Sweden have recently joined the staff of the Benguet Consolidated Mining Company in the Philippine Islands. **W. Hatch,** mill superintendent, and **S. M. Glyachenkoff,** mine foreman, both of Benguet, recently returned from five-month vacations.

George M. Barnett, formerly of Butte, Montana, is a research metallurgist for the Cyprus Mines Corporation in South Rouriotissa, Cyprus.

Halvar Gjestland, Reidar Halst, Fritchjof Prydz, Frederick Qvale, Edgar Johannesen, and **Kjell B. Langballie,** Norwegian industrial leaders, recently visited the Mesabi Range. **Carl Christofferson** led the group for the United States Foreign Operations Administration which sponsored the tour.

P. J. D. Regester and **W. T. Dunne,** both of Kuala Lumpur, Malaya, have been appointed as additional members of the Raub Australian Gold Mining Company's Board of Advice in Malaya.

A delegation from the Gold Coast of Africa, recently visited Canada to inspect aluminum production in connection with the Volta River Scheme. Members included **Kodwo Mercer, Kofi Baako, K. A. Gbedemah** (Minister of Commerce and Industry), **Kojo Botsio** (Minister of Education), **S. M. Codjoe, K. C. Tours** (Acting Minister of Finance), **W. E. Ofori Atta, Dr. E. K. Kurankyi Taylor, Dr. J. C. de Graft Johnson,** and **Gerald Plange.**

Dr. Albertus Johannes Roux van Rhijn is serving in the South African Cabinet as Minister of Mines and also as Minister of Health and Nutrition.

A. G. Glenister has been reelected chairman of the Malayan Chamber of Mines in London for the tenth year. **W. M. Warren** has been reelected vice chairman. Both men are directors of several Malayan tin mining companies.

Roscoe Canon, southern district manager of Marsman & Company of the Philippine Islands will succeed **J. B. Stapler** as general manager upon Mr. Stapler's retirement. **Jones R. Castro** has been promoted to mill superintendent at San Mauricio, N. Camarines for the Marsman Company.

Parke A. Hodges of Behre Dolbear & Company, mining consultants, has returned to New York headquarters of the company after a trip to Spain and Portugal. **Samuel H. Dolbear** and **Dr. A. F. Banfield** of the Behre Dolbear have been examining asbestos deposits near St. Odilon, Quebec.

Hidesaburo Kurushima, Japanese mining engineer, is fulfilling a United Nations Technical Assistance Administration assignment in Yugoslavia where he is advising the government on mining and processing of large copper ore deposits recently explored in Majdanpek, Eastern Serbia. Mr. Kurushima is well known for new copper smelting methods which he introduced in Japan.

LEO A. LYONS, smelter superintendent for the Electrolytic Refining and Smelting Company of Australia Pty. Ltd., Port Kembla, New South Wales, Australia, has been visiting nonferrous smelters and refineries in Japan. He is a widely known copper metallurgist who spent several months visiting African copper smelters in 1951 and has written several technical articles for Mining World describing smelter operations. In Japan he plans to visit the Hitachi and Saganoeski copper smelters of the Nippon Kogyo Kabushiki Kaisha, and the Ashio smelter of the Furukawa Mining Company, Ltd.

Rene Cardot is chief metallurgist engineer with Cie des Mines d'Ouasta et Mesloula in Paris.

Norton Jackson, metallurgical engineer in charge of the South Australian government's project at Radium Hill, South Australia, has visited uranium plants in the United States and Canada and has returned to Radium Hill. Radium Hill will be one of Australia's important uranium producers.

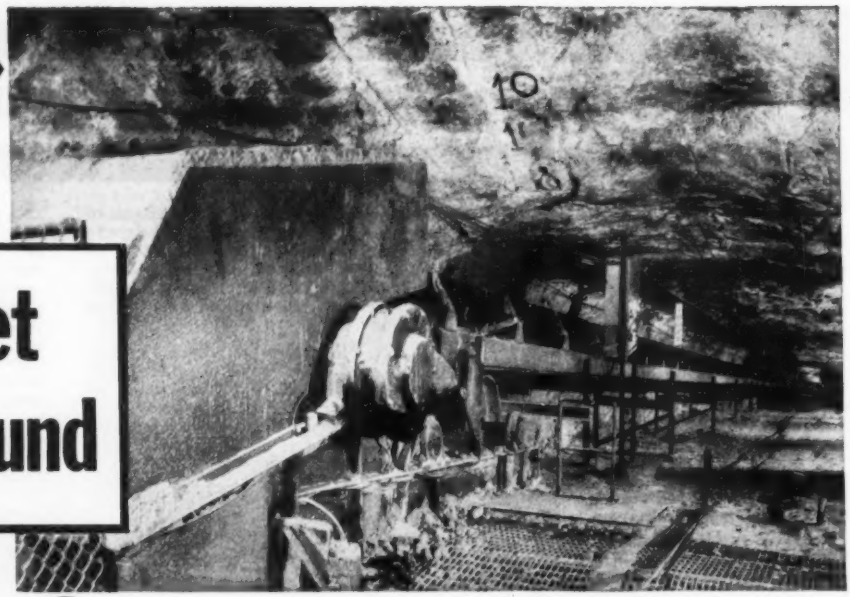
J. Hall Carpenter, president of the Carpo Manufacturing and Engineering Company in the United States recently toured tin mining centers in the Federated Malay States. He has been studying the use of electrical methods in tin sheds to reduce labor and cost and other methods in drying and roasting for elimination of pyrite and other contaminators.

Dr. J. K. Gustafson, consultant for the M. A. Hanna Company of Cleveland, Ohio, and member of the advisory committee on raw materials for the U. S. Atomic Energy Commission, has inspected a uranium field in Australia, 80 miles east of Pine Creek and 230

(*Continued on page* 80)

ARTHUR KENDAL is in Korea as general manager of Utah Construction Company's tungsten expansion program under contract with the government of the Republic of South Korea. Mr. Kendal, former manager of the Central Eureka Corporation's gold mine at Sutter Creek, California, replaces DAVID D. BAKER who has returned to the United States.

View down the conveyor, from head shaft to tail shaft. Ore "climbs" this slope. 400 tons per hour.



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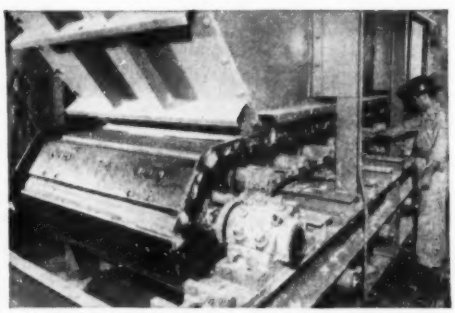
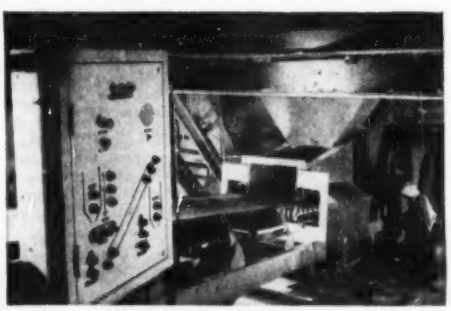
Mine cars in 20 to 30 car trains are individually dumped without uncoupling into a receiving hopper. Under the hopper, an S-A AMSCO Manganese Steel Feeder feeds the Sylvinite potash ore to a crusher that discharges minus 5" crushed ore to a storage stope. Under storage an air operated cut-off gate feeds the ore to another AMSCO feeder with a capacity of 400 TPH. Ore passes through a discharge spout to the 30" S-A Belt Slope Conveyor. It is carried more than 800 feet, with a 165' lift, at a rate of 350 FPM and 400 TPH and discharged into a large ore pocket, to be hoisted to the surface.



AMSCO secondary feeder that discharges to belt conveyor. An S-A Tellevel control automatically stops the feeder if there is a choke-up.



Tail shaft area of belt conveyor. This electric control panel flashes a complete operating picture of the entire system.

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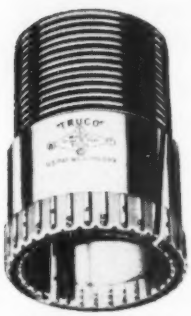

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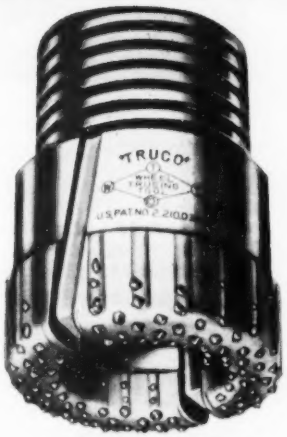
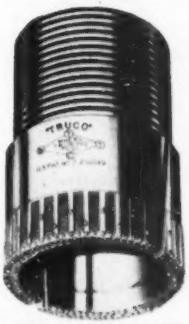


TRUCO Coring Bit



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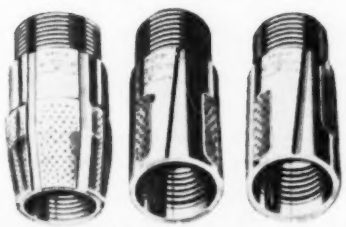

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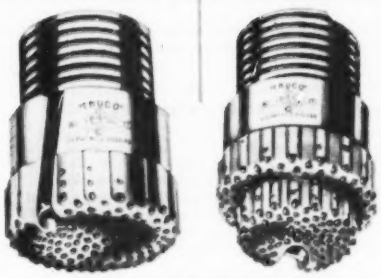

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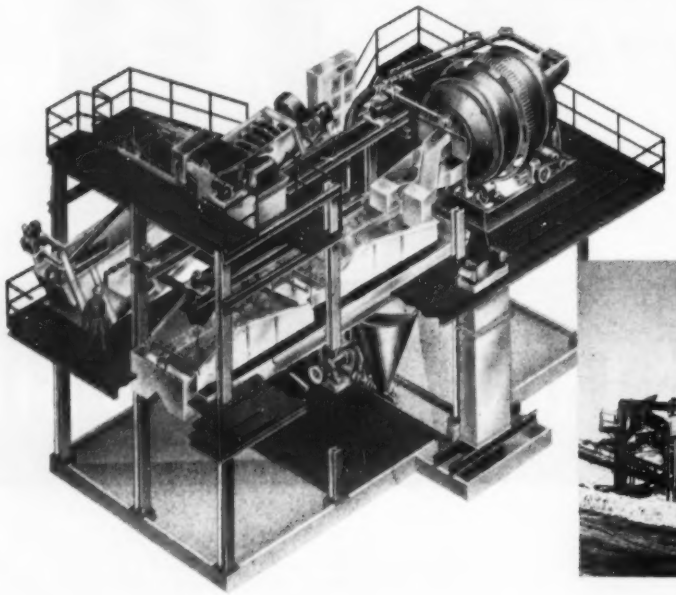

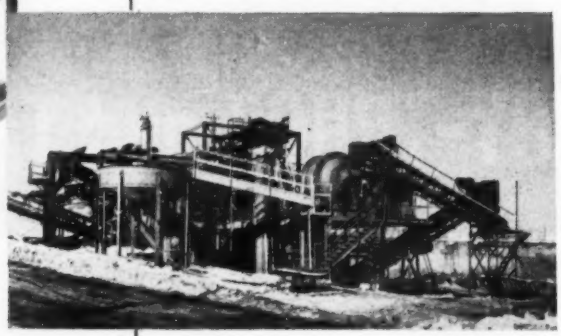

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INTERNATIONAL NEWS

Ownamin Ltd. Starts New Brunswick Operations

Ownamin Ltd., Canadian exploration division of Rio Tinto Co., Ltd., has staked several hundred claims in the Woodstock area, 50 miles northwest of Frederickton in New Brunswick, a few miles east of the New Brunswick-Maine boundary and expects to undertake a winter work program in the area. Extent of the holdings and nature of work to be undertaken has not yet been announced.

Earlier this year, Ownamin announced plans to spend at least $150,000 on Area Mines Ltd.'s 101-claim holding in the Gaspe copper district of Quebec. Ground geophysical work has been done during the summer in this area and more is planned for 1954.

Ownamin, formed in February of this year, has been given an initial budget of approximaetly $200,000 by Rio Tinto to investigate Canadian properties and to make preliminary explorations.

Operations Suspended At Mindanao Mine and Mill

Mindanao Mother Lode Mines Inc., one of the Philippine Islands' major gold mines, has shut down its mill and suspended operations at its mine in Surigao, Mindanao because it has found it uneconomic to continue further operations under present production costs. Cost of production at the mine is understood to be higher than that of any other gold mine in the Philippines, while the grade of ore it has been mining is marginal and does not warrant further operation.

The company's board of directors following an emergency meeting decided to stop operations and find other ways of using the mine's present equipment and personnel by continuing search for other mining properties. The shutdown is expected to throw out of work most of the 2,000 laborers on the mine's payrolls. It is reported that the company is negotiating with Masera Gold Mining in Davao to exploit the rich and extensive mineral deposits of that company.

Mother Lode is the first major mine forced to close because of its inability to survive present high production costs and sustain losses arising from the recent decline in the price of gold in the face of decreasing values in the recovery value of its ore. It is the second gold mine to suspend operations, however, this year, the first being United Paracale in the Bicol peninsula which was forced to shut down owing to the collapse of its major tunnel where it had been getting most of the ore it was feeding the mill.

The Philippines' largest and oldest mines, Benguet Consolidated Mining Company and Balatoc Mining Company, warn that they might be forced to suspend operations and throw 6,000 laborers out of work as a result of a labor department order slashing the amount deductible daily from the wages of these workers to pay for facilities being furnished them by the management. The warning was made by the two mines in a petition to the supreme court asking that the labor department order be annulled.

Atok-Big Wedge Mining Company, another major gold mine in the Baguio district, was understood to have issued a similar warning. In mid-October Atok began laying off men—100 at a time. This mine was at one time threatened with closure because the additional wages it had to pay its laborers as a result of the minimum wage law increased its losses.

First Norway Columbium From Sove Arrives In U. S.

The first shipment of columbium concentrate from the Telemark mine of Norsk Bergverk A/S in the Sove ore fields near Ulefoss, central Norway, has arrived in a United States port. An estimated 6,000,000 tons of columbium ore has been found in the Sove district in Telemark province. These deposits are reportedly the largest in Europe.

Norsk Bergverk started operating its pilot processing plant last summer and initial plans call for mining approximately 40,000 tons of crude ore a year which will yield about 150 tons of 50 percent columbium concentrate. The plant is designed so that it may be expanded to meet future needs. By-products of the processing are manganite and apatite concentrates.

Brazilian Manganese Ore U. S. Steel Will Develop

The United States Steel Corporation will develop the Urucum manganese deposits in Brazil under a special contract recently negotiated with the government of the Brazilian state of Mato Grosso.

Under terms of the agreement, the state of Mato Grosso will receive 3.0 percent of the manganese developed for export to the United States up to a maximum of 250,000 metric tons. If more than 250,000 metric tons are developed, the government will receive 3.5 percent. The state government will also receive, in advance, 10,000,000 cruzeiros (Brazilian currency).

U. S. Steel will be obligated to mine a minimum of 50,000 metric tons annually and must also spend 20 percent of its profits from the operation in the Corumba district, where the manganese ore deposits are found. The company has the right to mine the deposits for 50 years.

Western Nickel Continues Operations Near Hope, B.C.

The Newmont Mining Corporation subsidiary, Western Nickel Mining Company, is driving an exploration adit and continuing with diamond drilling at its Pacific Nickel mine 12 miles north of Hope, British Columbia, where the company is seeking a downward extension of the previously developed nickel ore body. The DMPA is committed to furnish half of the funds necessary to develop the property for large-scale mining when exploration conditions warrant.

Diamond drill intersections at the horizon of the new low level exploration adit (2,600-foot elevation) showed sulphides containing nickel and copper 1,000 feet below the bodies already developed. However, none of this is reported to be of commercial grade yet.

When the adit is driven westerly from the Red Rose claim to a point directly under the proven ore bodies, further diamond drilling is planned. The adit is being advanced at a rate of about 500 feet per month. Barney B. Greenlee is general manager of the project.

Matlock Lead Co. Finds Ore in Derbyshire, U.K.

A large lead deposit at Riber Hillside, Matlock, Derbyshire, England, has been discovered by Matlock Lead Mines, a company jointly owned by the Johannesburg Consolidate Investment Trust and the Derbyshire Stone, Ltd. The company is considering plans for development of the deposit which was found by diamond drilling. A 9-by-9-foot shaft was then sunk 750 feet at 50° dip to confirm the discovery.

If further tests confirm the full extent of the ore body, it is believed that £500,000 will be necessary to finance the project. The company proposes to erect a plant capable of treating enough ore to produce 10,000 tons of lead per year.

DMEA Revises the Minerals Exploration Regulations

The regulations under which the Defense Minerals Exploration Administration will continue to help finance cost of exploration for unknown deposits of strategic minerals have been amended to restrict the program to those minerals still in shortest supply for defense needs. The amendments also reduce the maximum percentage of the government's participation in the approved costs of any exploration project from 90 percent to 75 percent.

Government assistance is now available for the following metals and minerals: Group A, for which the government will contribute 50 percent of the approved project costs includes chromium, copper, and molybdenum; and Group B, for which the government will contribute 75 percent of the approved costs includes asbestos (chrysotile only), beryl, cobalt, columbium, manganese, mica (muscovite block and film only), nickel, platinum, tantalum, tungsten, and uranium.

According to Secretary of the Interior Douglas McKay, the practical effects of these revisions are: 1. the elimination of crocidolite and amosite types of asbestos, refractory grade bauxite, industrial diamonds, and thorium from the list of minerals previously eligible, and 2, the shifting of all remaining commodities heretofore eligible for 90 percent government participation into the 75 percent category, which group previously included only manganese and tungsten.

Mozambique Manganese Deposits Investigated

South African General Ore Company of Johannesburg, South Africa is investigating the manganese deposits of the Mazoe River near Changara, Mozambique, as well as the rutile occurrence at Massamba in the Tete district.

The deposits were recently visited by the managing director of the company, John A. Collinson; Dr. Tonnelli, a consulting engineer from Lourenco Marques; and the geophysicist, J. N. Jordan.

New USSR Hydro-Electric Plants To Up Metal Output

Two new hydro-electric plants, one reportedly completed, and one reportedly under construction in Eastern Kazakhstan, Russia, are believed to have considerably eased the non-ferrous metal situation in the Soviet Union. The Ust-Kamenagorsk plant and the Kuk-Htarminskaya plant, both on the Irtysh River, will serve a rich zinc, lead, silver, copper, gold, tin, and tungsten area. According to United States observers of Russian economic activities, development of this rich region had been held back by lack of cheap hydro-electric power.

Another significant aspect of the new plants is their proximity to the Chinese province of Sinkiang, which is also rich in non-ferrous metal resources and which, officials believe, is Russian-controlled.

The Ust-Kamenagorsk station is one of five such plants programmed for the five-year plan begun in 1950. Six more are scheduled for operation in 1960. According to "Izvestia," the Moscow paper, completion of this station will facilitate smelting and enable Russia to undertake new metal and mining enterprises.

Although capacity of the new plant is not announced, the five-year program for the five plants called for installed capacity of 4,016,000 kilowatts.

Dutch Firm To Experiment With Norway Manganese

Experimental mining of manganese ore layers is being done by Intertransport of Rotterdam, a Dutch company, at Bremsnuten in Telemark, southern Norway, where "rather rich" deposits of ore have been indicated. The company expects to mine experimentally for a three-month period.

Idle Malay Iron Ore Mine To Start Producing in '54

Roads leading to the long-idle iron ore mine at Srimedan, 12 miles north of Batu Pahat, in Malaya are now being cleared and levelled in preparation for mining operations which are expected to begin early in 1954. It is reported that the mine will be able to produce between 30,000 and 40,000 tons of ore per month.

Tan Chenge, manager of the newly formed Malayan Miners' Company which will operate the mine, has been negotiating with Japanese steel officials for the mine's output.

BRITISH COLUMBIA – *Penticton Tungsten Mines, Ltd.* has been organized to develop a tungsten-bearing tactite ore body on Riordan Mountain 26 miles west of Penticton. W. A. Lougheed of Penticton is president, and Wellman Clark of Spokane, Washington is secretary-treasurer. The deposit is at an elevation of 7,000 feet on claims staked as a gold-copper prospect 60 years ago by James Riordan. Frank Eichelberger, Spokane mining engineer, and Walter Melrose, Spokane mining geologist, superintended drilling and blasting of large rock samples for assaying.

SASKATCHEWAN–Underground development operations are now underway on the *Tor* group of claims of *Meta Uranium Mines Ltd.* located on Beaver Island, south of the Eldorado Fay shaft area, in the Lake Athabasca area. All necessary equipment for the Meta adit is on the property. The track at the portal is located at a point approximately 75 feet from and 10 feet above the level of Lake Athabasca. Meta is financed by *Consolidated Quebec Gold Mining Corporation* and *National Malartic Mines.*

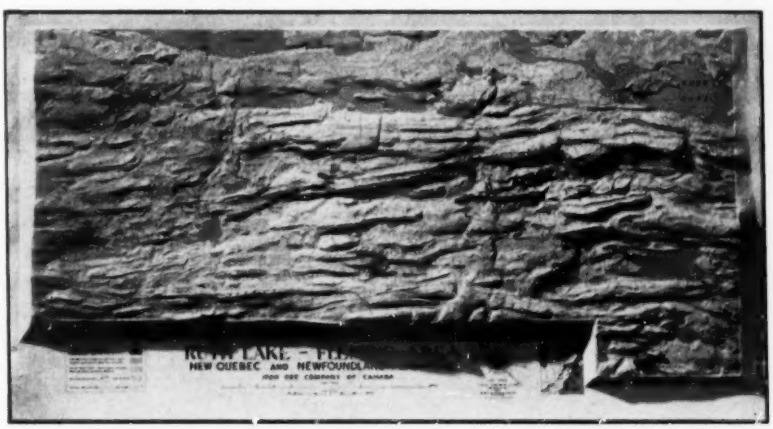
ONTARIO–The new 100-ton mill of *Ray Silver Mines Ltd.* is scheduled for operation next month. The company has been conducting stope preparation work at its Farr township property. More than 300 feet of drifting has been completed on the 205-foot level with the ore reportedly running about 1.0 percent cobalt over a width of 30 inches. Crosscutting on the 135-foot level is well under way with about 2.0 percent cobalt showing across 18 inches. At its recently acquired 5-claim group, the *White Reserve*, near the main property, the company will dewater the shaft and then explore a vein on the 140-foot level.

ARIZONA–*Riviera Mines Company* of Phoenix and the General Services Administration have signed a three-year contract covering delivery of 3,000,000 pounds of refined copper from the *Christmas* mine in the Banner mining district of Gila County. The government will pay Riviera 32 cents a pound for the copper, less differentials.

ALASKA–The large iron deposit near Klukwan, 24 miles from Haines, has been taken over by *Quebec Metallurgical Industries*, a subsidiary of *Frobisher, Ltd.* and *Ventures, Ltd.* of Canada. QMI is conducting an exploratory program on the property which consists of road building, pitting, sampling, and test sluicing to determine recoverable mineral content of the alluvial deposit. Results have been reported favorable to date but future work depends upon more contract negotiations.

NORTHWEST TERRITORIES–For the three-month period ended September 30, production at *Giant Yellowknife Gold Mines, Ltd.* was about 30 percent higher than for the same period of last year. Value of output increased from $1,272,596 to $1,653,702. Tonnage milled increased 14 percent to 67,120 tons, an average of 729 tons per day compared with 638 tons per day a year ago. The company's gold property is at Great Slave Lake.

SASKATCHEWAN–Diamond drilling has been started by *Clix Athabasca Uranium Mines Ltd.* along a radioactive lineament in the Grif Lake-Gancho Lake sector of its 38-claim group south of Beaverlodge Lake. The drill program will also test zones in the Pato Lake area, and the district south of Salto Lake.



LIGHTWEIGHT PLASTIC MAP OF LABRADOR

Canadian Aero Service Ltd. of Ottawa, Canada, and Aero Service Corporation of Philadelphia, Pennsylvania teamed to produce this new relief map for use by the Iron Ore Company of Canada, Ltd. in its mining development of Labrador. Formed in lightweight plastic, the map is 58 by 31 inches in size. It covers the Ruth Lake-Fleming area at a scale of 1 inch equals 1,000 feet with a vertical exaggeration of 2 to 1. Weighing only 1.5 pounds, the same map formed in plaster would weigh over 100 pounds. Both terrain problems and the geologic situation of the area are shown. Geologic data provided by the Iron Ore Company was lithographed on the map in three colors before forming.

ONTARIO—*New Ryan Lake Mines* has resumed milling at its copper property at Matachewan, and two carloads of concentrate have been shipped to *American Metal Company* in New Jersey. About 150 tons of mill feed per day are coming from stopes on the second or 200 level. Shaft deepening is continuing with drifting already started on the third level but no announcement has been made about opening a fourth level.

IDAHO—*Bear Creek Mining Company*, wholly owned subsidiary of *Kennecott Copper Corporation*, is investigating the *IXL* copper prospect and the *Duerden* zinc property, both located in central Idaho.

ALASKA—*Kenai Chrome Company* has shipped its first ore to the United States from its deposit at Red Mountain near Seldovia. Ore is coming from two raises driven into the Star 4 chromite ore body. The ore is trucked to the beach, and moved from shore bunker to dock by belt conveyor. An aerial tram is planned for the future. Coastwise Line has been awarded the shipping contract.

QUEBEC—*Molybdenite Corporation of Canada, Ltd.* is deepening its shaft from the 625-foot level to 800 feet and is increasing its 250-ton mill capacity to at least 500 tons. A $540,000 allotment credit from the U.S. Export-Import Bank has enabled the firm to undertake the expansion. A U.S. Defense Materials Procurement Agency contract negotiated last April calls for delivery over a 6-year period of up to 6,000,000 pounds of molybdenite and about 450,000 pounds of bismuth metal. Mining and milling operations were suspended at the time of the negotiations to enable the company to formulate expansion plans, and arrange for necessary financing. The bank credit will be supplemented by the public sale of stock. Molybdenite's property covers 1,718 acres at the junction of La Corne, Lamothe, Vassan, and Malartic townships in northwestern Quebec.

SASKATCHEWAN — *Rix - Athabasca Uranium Mines, Ltd.* has completed underground drilling from the second level of the Smitty orebody which is now under development. A possible 80 feet of down dip extension to the ore from the 150 level was indicated by drilling up to the hanging wall 200 feet east of the shaft. Drill exploration is now under way to test for ore continuity above the 150-foot level. The first level 50 West raise is up 109 feet in continuous ore, and is waiting for clearance of the Smitty swamp area before proceeding to the surface. Work in three other raises and two drifts is making suitable progress. Construction of permanent camp buildings and employe housing is continuing on schedule.

NEVADA—Stripping operations are in progress at *Nevada Mines Division, Kennecott Copper Corporation's* new *Veteran* pit in White Pine County. *Isbell Construction Company* has the initial contract for removal of 4,000,000 tons of waste and overburden. About 60,000,000 tons have to be removed before mining can actually start.

ALASKA—*Zenda Gold Mining Company* of Seattle, Washington has sold all of its holdings except Alaska tin properties to *Zenda Exploration Company, Ltd.*, the Canadian subsidiary. This will permit the company to concentrate all of its efforts on the exploration of the tin deposits discovered in the Cape Mountain region of Alaska. The management is presently considering a plan which would allow it to finance its own recovery operation and get production started during 1954. Drilling has ceased for the winter. Zenda expects the Cape Creek operation to require 4 to 4½ seasons of work (100 days per season), based on handling 2,000 to 2,500 yards of gravel per day through the mill (or washing plant) turning out a clean cassiterite concentrate containing 60 to 70 percent tin. The company has also indicated that it might consider operation of a dredge where drilling results have shown dredging is feasible.

ONTARIO—*Algom Uranium Mines Ltd.* reports that a new two-drill program is now under way because of the success of the first 16 holes drilled at its Quirke Lake property. Under the new program all holes will be drilled at an incline and at right angles to the main uranium-bearing formation. At Pecors Lake, drill exploration continues, while on the 290-claim Elliott Lake holding where a number of east-west striking radioactive surface showings have been discovered, preparations are under way for the start of a drilling program.

BRITISH COLUMBIA—During the first nine months of this year, *Bralorne Mines Ltd.* milled 138,637 dry tons to recover 54,291 ounces of gold. A new internal shaft, called the Queen, will be sunk from the 26th level in the footwall of the "77" vein to a depth of 600 feet and four new levels will be established. Preliminary work for this shaft has started. Work on the *Gray Rock* prospect was stopped at the end of September, when it was decided that the property did not warrant additional expendi-

tures. Exploration on the *Lustdust* property was continued with inconclusive results.

ALASKA—Three Juneau men, Walford Peterson, Oscar Elisen, and Louis Dyrdahl, were the first to stake claims on a newly discovered copper deposit in the Palmer district. Mineralization is indicated to be 50 to 100 feet wide in a band extending about 7,000 feet. While low in grade, the deposit is reported to be large enough to be of commercial interest. Other copper prospects in the Territory on which some work is being done include one at Glacier Creek in the Chitina district, and the large *Orange Hill* deposit in the Nabesna district where five men from *Kennecott Copper Corporation's* subsidiary, *Bear Creek Mining Company*, are exploring.

BRITISH COLUMBIA—New records are being set by the *Giant Mascot Mines, Ltd.* at Spillimacheen. During September 16,581 tons of ore were milled for a production of 917 tons of lead concentrate resulting in an operating profit of $51,200. Previous record was set in July 1952 when 457 tons of lead concentrate were produced from 7,500 tons of ore for an operating profit of $48,284. At that time lead was selling for 19 cents per pound. Giant Mascot's recent achievement makes it one of the few lead producers who have been successful in combating low metal prices. The chief factor has been an aggressive program of expansion and development. In the mine the new low level crosscut at No. 7 horizon has been completed and is now in ore. This gives an additional 125 feet of vertical depth on the main ore body.

ONTARIO—*International Minerals & Chemical Corporation* is diamond drilling nepheline syenite properties in southern Ontario. A new mill to process this material is scheduled to be built at Blue Mountain for operation by the middle of 1954.

NEW SOUTH WALES—*Titanium Minerals Ltd.*, one of the newest of the rutile producers, is seeking additional capital to undertake a close test drilling campaign for tin at Evans Head on the north coast. The company temporarily suspended rutile production because of flood damage and drops in the price of rutile. At Wellington, the dredge of *Wellington Alluvials Ltd.* is now working in better ground. Yardage in recent weeks has been about 70,000 for a fine gold recovery of up to 320 ounces. Small quantities of industrial diamonds are also recovered.

VICTORIA—*Morning Star (G.M.A.) Mines N.L.* will discontinue its main shaft and will sink an inclined internal shaft because the main shaft entered vertically bedded slates which were severely crushed and water impregnated. The new shaft will be sunk in diorite. The use of steam in the mine has been discontinued, providing an estimated saving of 33 shillings per ton of ore. Average cost last year was 147 shillings against 124 shillings in the previous year.

TASMANIA—*King Island Scheelite Ltd.* on King Island treated 19,343 tons

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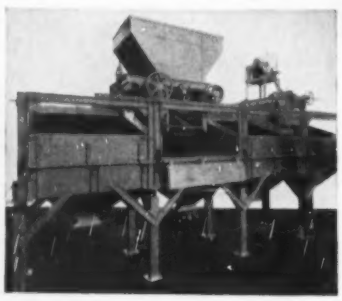

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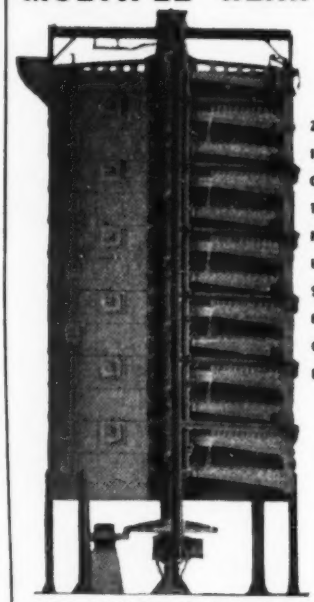

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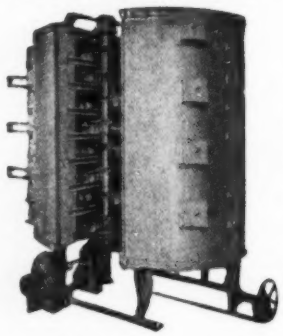

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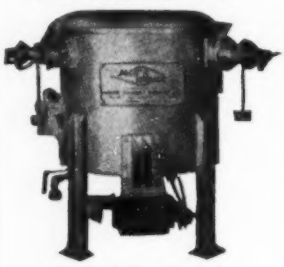

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of ore to recover 109 tons of concentrate valued at £169,500 in the four-week period ended September 30. This was the highest financial return in two years, and the company hopes to increase output further. In the previous four weeks ended September 5, the company treated 18,025 tons of ore to recover 98.1 tons of concentrate.

WESTERN AUSTRALIA—*Kalgoorlie Southern Gold Mines N.L.* has advanced hole SE4 to 5,287 feet. From 4,609 to 5,287 feet, sheared and carbonated quartz dolerite greenstone was encountered with a number of narrow veins carrying weak pyritic mineralization. At 4,737 feet, a vein assayed 2.25 dwt. gold per ton over 6 inches. This type of rock is characteristic of the Kalgoorlie gold-bearing formations so indications are considered to be encouraging.

PHILIPPINE ISLANDS—Scheduled to begin in February 1954 is an aero magnetic mineral survey which will cover six different districts in six provinces: Pidig, Ilocos Norte; Bulacan, Bulacan; Larap, Camarines Norte; Marinduque, Marinduque; Matti, Davao, and Pagadian, Zamboanga. This will be the first of its kind in the country and has financial assistance from the Foreign Operations Administration and the Philippine Council for United States aid.

FIJI ISLANDS—During the 12-week period ended September 16, *Emperor Gold Mining Company Ltd.* at Vatukoula treated 31,185 tons of ore for a recovery of 10,786 ounces of gold. *Loloma (Fiji) Gold Mines N.L.* milled 13,171 tons for recovery of 6,823 ounces of gold during the same 12-week period.

VICTORIA—In the year ended June 30, *Harrietville (Tronoh) Ltd.* produced 8,600 ounces of placer gold, compared with 7,434 ounces in the previous year. Yardage dredged is about 230,000 per month.

TASMANIA—Directors of *Moina Tungsten Tin Mining Company N.L.* at Moina feel that present metal prices should be profitable and so leases are being obtained on an additional 80 acres of ground. The Moina operation has been compared favorably with the well-established *Aberfoyle Tin N.L.* which is a consistent tin producer.

SOUTH AUSTRALIA—Power from Adelaide is now being supplied to Radium Hill. The transmission line from Morgan, on the Murray River, to Radium Hill is almost perfectly straight across 128 miles of virgin country. It was built at a cost of £A750,000. A road has been built beneath the line. Until now, roads were non-existent in the area. The Port Pirie uranium plant will be enlarged, the estimated cost now rising to £A1,500,000 instead of the previous estimate of £A1,000,000. Uranium salt production will start during the first half of next year.

WESTERN AUSTRALIA—At Mt. Magnet, *Hill 50 Extended N.L.* has taken options over the *Kit Lefroy* and *Havelock* leases and has started diamond drilling.

PHILIPPINE ISLANDS—For the fiscal year 1954, the Bureau of Mines announces the following strategic mineral survey program: expansion survey and drilling of the manganese deposits in Bohol; geological survey and drilling of the manganese deposits in Baybay, Leyte; drilling of the copper deposits in Negros Occidental; drilling of the chromite deposits of the *Floranie* property on Camarines Sur; drilling of the chromite deposits of Opol, Misamis Oriental, Mindanao; re-examination of the Surigao laterite fields for locating of high concentrations of nickel and reserves; geological and mining investigations of several dormant chromite deposits of Zambales province, Luzon.

NORTHERN TERRITORY—*Poscidon N.L.* has taken over *Lone Pine* lease, 130 miles east of Alice Springs. The area reportedly carries "good grade" uranium ore, as well as niobium and tantalum.

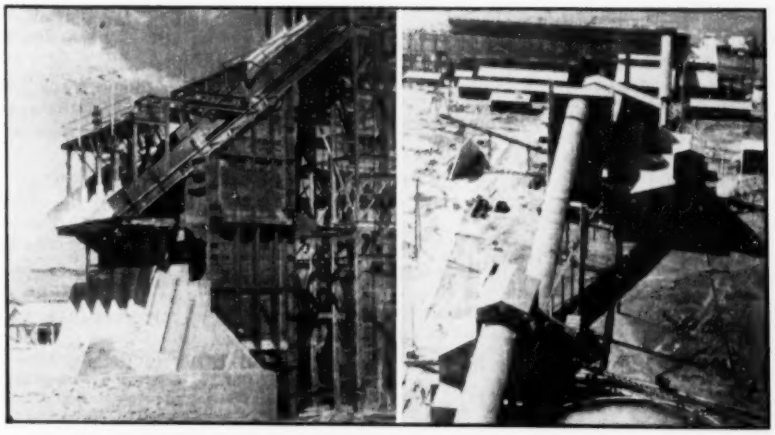
NEW GUINEA—*Bulolo Gold Dredging Ltd.*, in three months to August 31, treated 3,113,150 cubic yards for recovery of 19,892 ounces of gold, valued at $692,220. In the same period of 1952, 4,346,700 cubic yards were dredged to recover 31,064 ounces of gold valued at $1,087,240.

PHILIPPINE ISLANDS — *Benguet Consolidated Mining Company* must reorganize under a ruling issued by the Acting Secretary of Justice that Benguet could no longer extend its 50-year status as a "sociedad anonima." The company had appealed to be allowed to continue this status. The ruling has been forwarded to the securities and exchange commission. In requesting the extension, the company had maintained that it possessed that "vested right of which it may not be deprived by any statute." However, the Acting Secretary dismissed this argument saying that the state maintained the power to regulate the existence of such corporations.

AFRICA

NORTHERN RHODESIA—Dewatering of the Kansanshi main north shaft below the 150 level has been in progress since March of this year, with more difficulties encountered than originally anticipated. Abnormally heavy rainfalls aggravated the problem and additional pumping equipment had to be bought. As a result, work on another shaft—the D4—was suspended until June when a start was made on enlarging the shaft below the 150-foot level to provide adequate space for the sinking pumps while hoisting rock from the bottom. This shaft has to be deepened by 50 feet before development can proceed on the 300-foot elevation. Because of the large amount of water encountered, electric power and compressed air supplies had to be increased. *Anglo American Corporation of South Africa Ltd.* is supervising the development work; *Rhodesia-Katanga Company, Ltd.* holds the mineral rights. Under a recent agreement, a new company has been formed as the *Kansanshi Copper Mining Co., Ltd.* for the purpose of carrying out the work on this property.

NIGERIA—*Naraguta Karama Areas* is approaching its deep tin deposit on its property on the Bauchi Plateau by adit and shaft. The adit was advanced 363 feet last year and the shaft was almost completed. During 1952, output declined



ANOTHER SOUTH AFRICAN URANIUM PLANT

West Driefontein Gold Mining Company Ltd. has approval to continue with the erection of a uranium treatment plant with a capacity sufficient to treat the uranium-bearing slimes produced by its own mine and those produced by Doornfontein Gold Mining Company Ltd. The plant is expected to be in operation by the middle of 1955. The Atomic Energy Board of South Africa originally granted West Driefontein the right to build the plant in April 1951. However, construction was delayed in order that the plant and equipment ordered by the firm could be more economically used elsewhere. The pictures above show the West Driefontein gold reduction works. At left is the skip dump at the top of the No. 2 headframe. Coarse ore drops into the concrete-lined storage pocket in the foreground. By moving a section of the chute, waste can be diverted into the timber bin under the chute for transfer to the waste dump. The coarse crushing plant is in the foreground in the photograph at the right. The belt conveyors lead to the fine crushing and sorting section and on to the fine grinding and cyanidation plant in the background.

by 35½ tons of tin as compared with 1951. Prospecting added 25 tons to the ore reserves which totaled 532 tons at the end of the year.

SOUTH AFRICA—*New Consolidated, Free State, Exploration Company Ltd.* reports that its mineral rights on Saaiplaas 690 and Dirksburg 358 may be incorporated into a lease area under the administration of *New Consolidated Gold Fields, Ltd.* The Dirksburg mineral rights were acquired with the provision that New Consolidated Free State would apply for a mining lease incorporating Dirksburg or a portion thereof within 12 months of the date of cession of the rights or the grantor of the option could request recession of the rights. Other mining companies, including *Middle Witwatersrand (Western Areas) Ltd., Anglo-Transvaal Consolidated Investment Co., Ltd.,* and *New Union Goldfields Ltd.,* are reported to be contributing mineral rights also, which would be combined in the lease area. New Consolidated Free State would be entitled to one-third of the benefits.

GOLD COAST—*Nanwa Gold Mines Ltd.* is reported to be in the hands of receivers and it seems unlikely that operations which were suspended at the end of last year will be resumed.

SOUTHERN RHODESIA—*Rhodesia Monteleo Asbestos Ltd.* has closed down its property in the Vukwe Hills about 15 miles from Shabani and has placed it on a caretaking basis. The adverse market conditions, resulting in lower prices, made operation uneconomical for the company.

TANGANYIKA — *Uruwira Minerals Limited* plans to cede some of its leases to a new firm, *Katuma Mining*, formed for the purpose of developing this area. The property is being given up because Uruwira needs additional capital to bring its new plant into production (scheduled now for early 1955). A cash payment of £50,000 along with certain rights of participation, has been agreed upon. Unfortunately, Uruwira will still be short about £350,000, and although the government and influential parties have been contacted, no definite arrangements have been made. Late delivery dates, increased prices of machinery, and falling metal prices are among the reasons cited by the firm for its financial situation.

GAMBIA—The accepted view that Gambia has no minerals may soon be disproved. *British Titan Products, Ltd.* of York, England, third largest manufacturer of titanium pigments in the world, is conducting an exploration program in the country for ilmenite. Results to date are said to warrant further expenditure on extended exploration. A preliminary survey indicated that the ore extends from the surface to a depth of eight or nine feet near Sanyang, a village in Kombo South Division, about 30 miles south of Bathurst. Prospecting is presently being conducted with Banka drills and a magnetometer.

SOUTHERN RHODESIA—The *Air Survey Company of Rhodesia, Ltd.*, a subsidiary of the *Fairey Aviation Company, Ltd.*, has completed an aerial survey of the chrome claims of the *Windsor* mine, *Dessy*, and others held on the Great Dyke by R. V. Jeffery.

SOUTH AFRICA—*O'okiep Copper Company* has completed its exploration by drilling of the Nababeep West ore body and shaft sinking is now in progress. The company's new plant erected for the treatment of ore from the tungsten ore body two to three miles north of Nababeep has now been operating for some time. Milling proceeds at the rated capacity of 200 tons per day.

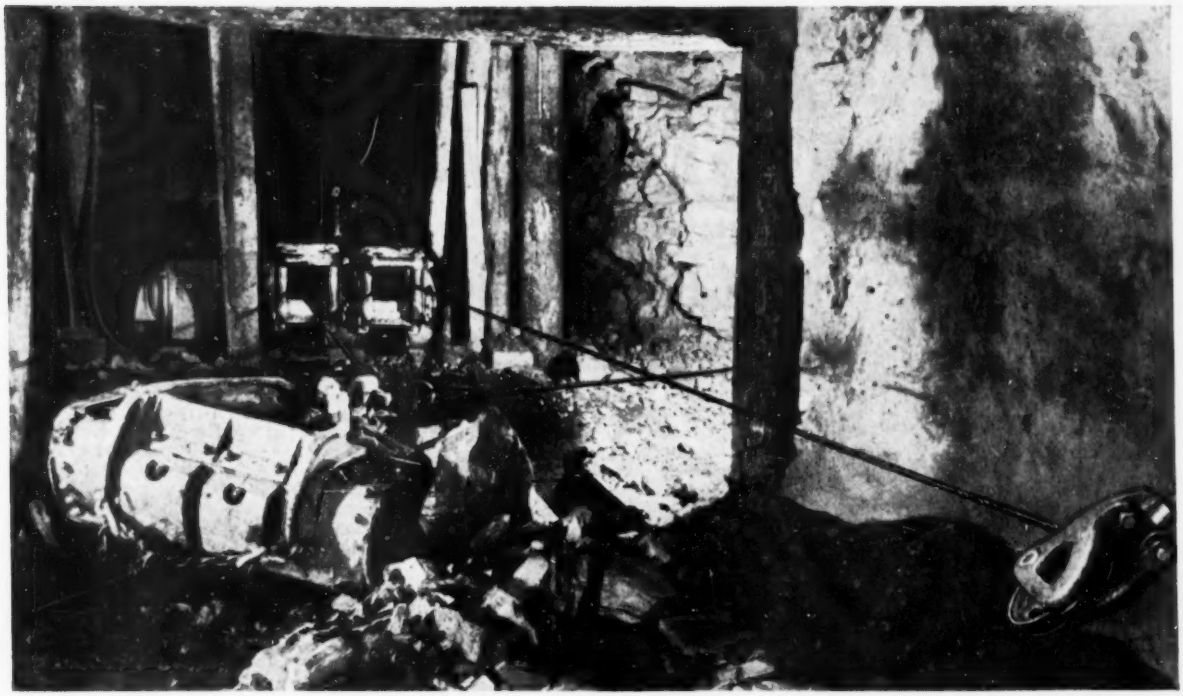
TOGO—The commissioner of the republic of Togo recently announced that investigations have revealed the existence of high-grade phosphate deposits in the vicinity of Anecho. The Phosphate Exchange of North Africa has requested permission to explore for phosphate in 10 locations within the area of Anecho.

MOZAMBIQUE—*Lusalite de Mocambique S.A.R.L.* has discontinued the development program on the *Serra Mancota* asbestos deposits near Macequece at the Southern Rhodesian border. The orebody was proved to contain chrysotile cross fiber from ¾ inch to ⅞ inch staple length, but the overall asbestos content was approximately 1 percent. The company owns asbestos cement works at Dondo near Beira, and imports asbestos from Southern Rhodesia for its own requirements. It owns the *Kilmarnock* mine in Southern Rhodesia which produces 100 short tons of chrysotile fiber per month.

ETHIOPIA—The Department of Mines, under the Ministry of Finance, is considering plans for an extensive exploration program of the country's mineral resources to be undertaken next year. This would be the first time that the government agency has sponsored such a program. At present, only gold and platinum are mined in Ethiopia.

MALAYA—*Kramat Pulai Ltd.* reportedly is still waiting for a decision on its lease application made about 15 months ago covering the Kampong Binjai area. Meanwhile, the company has received a permit to prospect the sea bed off the coast of Malacca; prospecting operations are getting under way. For some years there has been a small amount of tin production by Chinese miners working along the coast, and, although this is nothing more than an indication that worthwhile values may be found in the sea bed, the prospect seems interesting enough to warrant scout drilling. *Tromal Prospecting*, controlled by Kramat Pulai, is also waiting for the granting of lease applications by the Siamese government. Meanwhile, necessary plant and equipment are under construction.

INDIA—The first meeting of the Mineral Advisory Board set up by the government will be held in New Delhi, date as yet unannounced. Among the topics to be considered are ways of increasing production of metallic copper, lead, and aluminum; measures to be taken for discouraging the export of raw materials and encouraging the export of finished and semi-finished products. In this connection, the Board will consider the action necessary for bringing into production the *Khetri* and *Alwar* copper mines, for stepping up the development of lead deposits in Zawar, and for increasing production of the existing aluminum plants in Bihar and Travancore. The Board will also review the government's current mineral policy, and the research programs of the Bureau of Mines and the Geological Survey of India.



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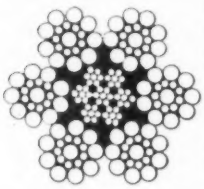

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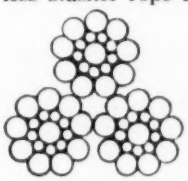

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UNITED STATES STEEL

JAPAN—*Nihon Kogyo Kaisha* (*Nihon Mining Company*) is reported to be negotiating with the Philippine firm, *Nielson and Company,* regarding expansion of milling facilities and auxiliary equipment at the *Hixbar* copper mine on Rapu Rapu Island in the Philippines. The mine was damaged by a typhoon last year and milling facilities were destroyed. Reconstruction is estimated as costing about $772,000; Nihon Mining Company reportedly would purchase enough copper production to repay Nielson for its expenditure. Nielson operates the mine for the *Hixbar Gold Mining Company.*

THAILAND—Reports from Singapore say that a rich tin deposit has been located in the Indian Ocean six miles off Phuket, Western Thailand. The area prospected is said to cover 40 miles by 12 miles and operations to have been conducted at a depth of 150 feet. *Tronoh Mines Ltd.* has been conducting dredging operations on the south side of Phuket Island but this apparently is the first time any one has worked the Indian Ocean side.

BURMA—Conditions of unrest in Lower Burma where the mines of *Tavoy Tin Dredging Corporation, Ltd.* are situated are still such that any mining activities are out of the question, and the Burma government will not allow the European staff to visit the mines. The Burma government has suggested that the tin-producing companies in Burma form a joint venture with the government, and this idea is being considered.

INDIA—The Joint Chief Controller of Exports at Bombay has announced that export of manganese and iron ore will continue to be licensed freely from Bombay and other minor ports in Madras State, provided that the ore is already at the port for shipment. The industry has urged that export licenses be freely granted for all minerals that have arrived at the port and also for such minerals and to such firms who are in a position to do mid-stream loading as it was done some time ago. Exports from ports like Madras, Calcutta, and Visakhaptnam are to be subjected to a quota system. It is, therefore, feared by industry that the volume of exports will dwindle.

MALAYA—The dredge of *Kramat Tin Dredging Ltd.* which is being re-erected on Banir estate in Perak is not expected to start dredging before March or April. Sixteen acres of Banir estate were acquired by Kramat for a dock site and for buildings which have been completed. The whole site is well laid out and has a piped water supply and electric lights. The erection of the dredge is under way.

JAPAN—Japan will import 40,000 tons of iron ore from Malaya on a trial basis during the next six months despite its shortage of sterling exchange. The *Fuji Iron and Steel Company* intends to buy from mines in the Ipoh (Perak) area which the company's experts surveyed recently. Some mines in the area were worked by Japanese during their occupation of Malaya.

TIBET—The Communist New China News Agency reports that a Chinese scientific expedition recently returned to Peking after spending two years in Tibet. The group report the discovery of 30 classes of ore deposits, including copper, iron, lead, zinc, and manganese.

PAKISTAN—During the first half of 1953, chromite production was 11,129 tons against 9,368 tons during the corresponding period of 1952. Of this

amount, *Pakistan Chrome Mines Ltd.* produced 8,051 tons, *Attock Oil Industries Ltd.* produced 1,820 tons, and K.B.H.M. Habibullah Company produced 1,308 tons. About 9,501 tons were transported by rail from Hindubagh (Baluchistan) to Karachi for export.

THAILAND—The cabinet has authorized the Ministry of Industry to proceed with plans for construction of a 100-ton steel plant at Kanjanaburi after geological reports of the iron deposits in the province have been studied.

MALAYA—*Austral Malay Tin Ltd.* reports that its associate companies produced the following tonnages of tin during September: *Thabawbeik Tin Dredging Ltd.* 43 tons; *Pungah Tin Dredging Ltd.* 34 tons; *Austral Amalgamated Tin Ltd. Asam Kumbang* (*On Tribute*) 10 tons; *Puchong* 75 tons.

INDIA—The government is considering a proposal to form a corporation which would run private and state-owned mineral factories in the state of Travancore-Cochin. The government of India would have no share in the corporation. Two factories have been taken over by the government after paying compensation. The state government retains control over sale of minerals while the government of India's powers are limited to fixing the percentage of monazite in minerals.

THAILAND—*Tongkah Harbor Tin Dredging Ltd.* has installed three new 670-horsepower Crossley Diesel engines on its Ronpibon dredge which is expected to go into operation in 1954.

MALAYA—Producers on the mainland shipped a total of 4,454 tons of tin-in-concentrates to Singapore and Penang during September. Total shipped during the first nine months of the year was 41,768 tons, compared with 43,038 tons in the same period of last year. Total shipped from Perak between January and September was 25,763 tons, from Selangor 12,134 tons, from Negri Sembilan 1,197 tons, and from Pahang 1,530 tons.

AFGHANISTAN—C. Watson Owings, United States Point Four mining expert, estimates Afghanistan's high-grade iron ore reserves at 3,000,000 tons, after completing a country-wide tour. He also believes that there are sizeable quantities of chrome, beryl, and sulphur. Coal reserves were estimated at more than 20,000,000 tons, with the largest reserves near Darr-i-Saf about 170 miles from the Russian border.

THAILAND—Japanese geologists who have been investigating iron and wolframite deposits at Koh Samui recently reported that further prospecting work would be carried out with the intention of mining in the area if arrangements could be made for a concession.

MALAYA—Scheelite was discovered in commercial quantities on the lease of *Raub Australian Gold Mining Company Ltd.* in 1952. Since that time a primary circuit for treatment and recovery of scheelite has been added to the plant and concentrates have been produced in small quantities. For the year ended March 31, 1953, the company reports that scheelite valued at £A10,307 was produced, at a cost of £A5,985. Production of gold increased during the year to 17,226,293 ounces at a net value of $2,115,406. The company was permitted to sell half of the output on the local free market.

BRAZIL—The deposits of malachite [$Cu_2(OH_2)(CO_3)$] located in Itapeva, State of Sao Paulo, may become a very important source of copper for Brazil in the near future. An agreement is being negotiated by Joao Baptista Almeida Prado, owner of the *Itapeva* deposits, and Francisco Pignatari, owner of the *Camaqua* copper sulphide deposits in the State of Rio Grande do Sul. According to the proposed agreement, the copper sulphide concentrates from Camaqua would be sent to Itapeva to be combined with the malachite concentrates before the ore goes to the smelting furnaces. If the agreement results in a contract, there is great hope that Brazil will be producing her own copper.

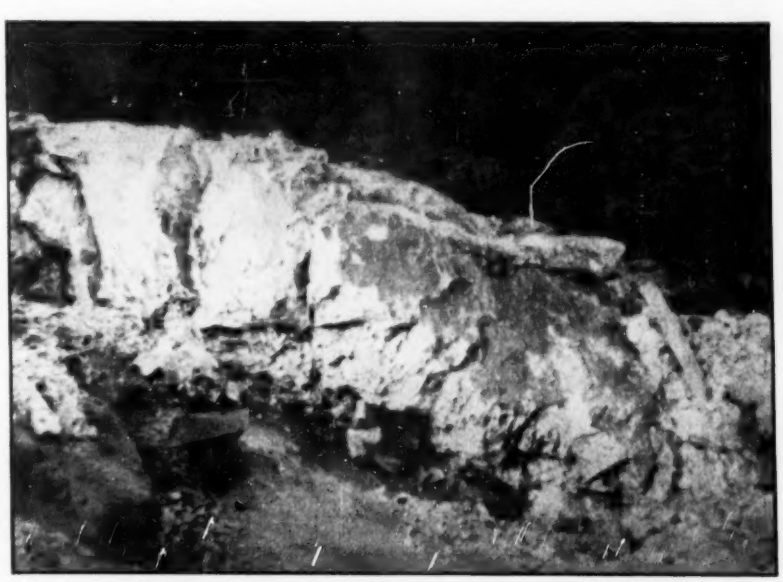
HAITI—*Reynolds Mining Corporation*, a wholly owned subsidiary of *Reynolds Metals Company*, has started development of its bauxite deposits in Haiti. The principal deposits, located about 80 miles from Port-au-Prince, were discovered some years ago. In 1944 the company entered into a 60-year agreement with the Haitian government for development of the industry. The deposits are similar to those in Jamaica, but initial production will be less than the 750,000 tons planned for Jamaica. However, installations are being designed to permit a rapid increase if demand warrants.

MEXICO—A large modern ore wharf is being built by the Navy Department at Tampico at a cost of $1,720,000. The more optimistic mining men cite this as an indication that their industry is not on the wane.

COLOMBIA—*Bulolo Gold Dredging, Limited* dredged 3,113,150 cubic yards during the three months ended August 31 for a recovery of 19,892 ounces of fine gold. In the same period of last year, the company dredged 4,346,700 to recover 31,064 ounces of fine gold.

BRITISH GUIANA—The *Aluminum Company of Canada* is keeping a close watch on its bauxite operations near Mackenzie, British Guiana, since the recent suspension of the colony's constitution by the British government. The fear that strikes and demands for nationalization might arise have not materialized but the firm is maintaining an alert vigil. The company operates three main mines—at Itumi, 36 miles from Mackenzie, and at Montgomery and Maria Elizabeth, six and nine miles away, respectively. The ore is hauled to the washing and drying plant at Mackenzie by Diesel locomotives. 10,000-ton freighters transport the cleaned and crushed ore to Trinidad for reshipment to Canada.

BRAZIL—The Brazilian government is studying the possibility of prohibiting the export of manganese ore from the mines of *Conselheiro Lafaiete, Saude, Bournier,* and *Itabira* in the state of Minas Gerais. These mines produce manganese ore with a Mn content above 44 percent, and are the only ones which can provide economic ore for Brazil's heavy industries.



A BERYL OPERATION IN ARGENTINA

This view shows a typical beryl operation in the Cordoba province of Argentina. The miner is pointing out the vein which is under four meters of granitic rock. Work is done by a small crew and monthly output is about four tons. The mined ore is hand-sorted with average grade running about 12 percent BeO. Beryl occurs chiefly in pegmatite dikes. The vein in this particular operation has an average width smaller than 20 centimeters. Argentina was at one time the second largest producer of beryl in the world. In 1952 it ranked fourth in world production.

COLOMBIA—The *South American Gold & Platinum Company* is preparing to sell its output on the free market. The Colombian government issued an edict in July permitting free sale of gold (See MINING WORLD, October 1953, page 85) but the company did not sell its output during the July to September quarter. The firm's gold output for the first nine months of the year was about 8,000 ounces less than in the same period of 1952 when output totaled 58,180 ounces of gold. Platinum output was about 1,000 ounces more than the 17,056 ounces produced in the first nine months of last year.

MEXICO—The National Silver Industry Chamber has requested financial and technical assistance from the Ministry of Communications and Public Works to economically cooperate with it in building a 15-mile road which would make possible the development of a rich silver-lead-zinc zone at Monte de Teneria, Guerrero. The road would link the zone with Taxco, an important old silver center in Guerrero.

JAMAICA—*Reynolds Jamaica Mines* has received one of the longest lengths of 1⅝-inch wire rope ever wound on one reel—15,500 feet. It will be used in the monocable tramway, reported to be the world's largest, which will extend 6½ miles from the bauxite mine to a ship-loading terminal at Ocho Rios on the north coast.

BRAZIL—*Companhia Niquel Tocantins* plans to produce about 4,500,000 pounds of nickel annually from its deposit at Niquelandia in the State of Minas Gerais. An aid to the development of the project is the almost completed highway linking Niquelandia with Anapolis in the State of Goias. Cobalt is reported to occur in the Niquelandia nickel deposits as an impurity in the ore.

MEXICO—The properties of the *San Carlos* mining cooperative at Pachuca, Hidalgo, are being sold at auction to raise funds to pay its debts, including back wages to members which have been in arrears for some time. The society was a pioneer in its field, and recently had to suspend work because it no longer had either money or ore.

BOLIVIA—*Patino Mines and Enterprises Consolidated Ltd., Mauricio Hochschild (S.A.M.I.),* and *Aramayo de Mines en Bolivie* reportedly have received notification from the Bolivian government that it is ready to discuss compensation for the mines it nationalized. An agreement was reached earlier this year which provided for deductions from proceeds of ore sales but the total amount of compensation was never decided upon.

AUSTRIA—The Alpine Montan Gesellschaft of Leoben which operates three major iron ore mines produced a daily average of 7,951 metric tons of iron ore in the first eight months of 1953. Total Austrian production for the first 8 months of 1953 was 1,590,140 metric tons compared with a total annual output for 1950 of 1,613,230 tons. Last year's production reached a high of 2,310,000 metric tons with aid of European Recovery Plan and Mutual Security Agency funds given to the Alpine Montan Gesellschaft. The Erzberg, largest of the Alpine company's mines, supplies about 87 percent of the total Austrian iron ore output. Erzberg iron is largely siderite ($FeCO_3$) averaging 32 percent Fe. Total ore and waste mined for 1952 was 9,987,000 metric tons with 2,310,000 tons of ore and concentrate.

CZECHOSLOVAKIA—An aluminum plant constructed at Sv. Kriz in the Gran Valley because of the availability of sufficient bauxite in Slovakia is now in operation. The plant will supply the Prague airplane industry primarily. Formerly, the Czechs imported aluminum from Russia, Austria, and Germany.

ITALY—The sulphur industry suffered during the first six months of this year because the demand for sulphur on the international market decreased at a time when the government was encouraging modernization of mining techniques and development of new resources. Consequently, sulphur output during the first six months of 1953 increased to 110,000 tons compared with 96,000 and 91,000 tons in the same periods of 1952 and 1951 while exports decreased to only 3,500 tons compared with almost 37,000 tons in the first six months of 1952 and over 49,000 tons in the same period of 1951.

AUSTRIA—The Veitscher Magnesite A. G. reports a 1952 production increase of 9 percent in magnesite sinter and 15 percent in magnesite stone. Sales of sintered magnesite decreased by 7 percent and sales of magnesite stone increased by 20 percent in comparison with 1951. Magnesite export stayed at about the

1951 level with 76.80 percent of sintered magnesite and 87.50 percent of magnesite stone shipped to foreign customers.

ITALY—The following table shows Italian mining industry production figures for the first six months of 1953 in comparison with figures for the corresponding periods of 1952 and 1951.

Mine Production of Ore
(In Metric Tons)

Commodity	1953 (First Six Months)	1952 (First Six Months)	1951 (First Six Months)
Iron and Iron-Manganese	517,000	388,000	245,000
Quicksilver	97,500	91,200	86,400
Bauxite	125,000	129,000	.....
Zinc	107,000	118,000	99,000
Lead	33,100	31,600	32,600
Coal	537,000	473,000	588,000

GREECE—Greek production of iron pyrite is now at the rate of 260,000 tons per year, according to reports from Athens. This compares with annual production figures of 244,000 tons in 1938 and 181,263 tons in 1951. Each year between 180,000 and 200,000 tons valued at $2,700,000 in foreign exchange are exported. At the Cassandra and Hermioni mines are the only extensive deposits.

ITALY—Because of a slow world market for antimony, *Azienda Minerali Metallici Italiani* has shut down its mine and smelter in Tuscany, Grosseto Province, and is working at a reduced rate in the Sardinian mines of Gerrei. Production of concentrates during the first half of 1953 was nearly 40 percent lower than in the corresponding period of last year.

AUSTRIA—According to latest reports, Ranshofen Aluminum Works expects to produce at the annual rate of 35,000 metric tons of aluminum by the end of this year. Ranshofen will be able to increase its production because of increased availability of electrical power.

GREECE—The Anglo-Greek Magnesite Company has increased production during the year which ended March 31 but profits have fallen because of higher production costs.

ITALY—*Societa per l'Industria Mineraria e Chimica* of Milan has opened a new bauxite mine near Caiazzo in Caserta Province. Production is on an experimental basis. The Montecatini company has been exploring the area for some years and the new mine is the first one to be opened.

YUGOSLAVIA—The *Ore and Chemical Corporation* has purchased a new No. 4 Wemco Mobil mill with an 8-by-8-foot drum separator for use in the *Mezica* lead mine at Mezica in the northern part of Slovenia, several miles south of the Austrian border.

AUSTRIA—August production for the mining industry was as follows in metric tons: iron ore, 218,144; lead-zinc ore, 7,134; sulphur ore, none; copper ore, 14,518; antimony ore, 763; bauxite, 1,264; graphite, 1,000; gypsum, 28,511; magnesite, 74,017; kaolin, 19,781; quartzite 4,711; clay, 4,691.

NORWAY—A Norwegian quarrying company has contracted to deliver 2,000 tons of Labrador granite for facing for the Henry and Edsel Ford Memorial Building in Detroit, Michigan.

EUROPE—Due mainly to greater exports of metals, raw materials and semimanufactured goods to the United States, Western Europe's indebtedness to the United States declined by $913,000,000 in the first six months of this year, according to a report from the United States Embassy in Madrid, Spain. Other factors contributing to Western Europe's favorable position are the increase of United States military expenditures in Europe and dollar receipts from other areas, particularly the Far East.

GERMANY—A Soviet geological commission has reported the existence of large copper ore reserves in the Mansfield district of the Soviet section of Germany. According to the report, drilling has uncovered ore at various localities in the district and a shaft is being sunk at one of the discoveries. All mines in the area have been merged into one company. However, many geologists believe that the Mansfield beds will soon be exhausted.

AUSTRIA—Production value of ore, coal, and non-ferrous minerals for 1952 has been estimated at $86,769,000. Coal amounted to $38,193,000 of this total. Export value of minerals for 1952 amounted to $25,653,000 with magnesite leading the list at $22,230,000. Oil and natural gas are not included in the above figures because Russia has exclusive rights to management of these commodities under the 1945 Potsdam Agreement.

ITALY—Production of crude iron ore in the first half of this year totalled 758,000 metric tons. This figure corresponds to about 500,000 tons of shipping ore because a considerable part of the ore is washed, concentrated, or otherwise treated before it is shipped. The figures indicate an increase of nearly 35 percent over the corresponding period of last year. A substantial part of the ore is from mines on the island of Elba.

International Mining Men

(*Continued from page 63*)

road miles southeast of Darwin. The new find is reported to have a uranium potential equal to that of the Rum Jungle area.

W. A. Hardy, agent and general manager of the Central Provinces Manganese Ore Company, Ltd. (Incorporation in England) of India, has returned to London to resume his duties in the head office of the firm. Mr. Hardy has been succeeded by **A. Welstead.**

R. C. Niemoller of Cape Province, South Africa, has been producing bismuth and scheelite for three years and now is producing sillimanite at his two mines.

Walter F. Brown has been appointed manager in charge of mining operations for Broulan Reef Mines, Ltd. of Ontario, Canada. Other appointments include **Ronald F. Dewar,** general superintendent; **John M. Girvan,** mine superintendent; and **Harry Pyke,** assistant mine superintendent. The company is preparing for expansion of operations at the Reef, Bonwhit, Hugh-Pam, and Banner mines, and exploration and development of the Godden, Dobie, and Kinch properties in Tisdale Township.

R. B. Sprague, geologist in the American Smelting & Refining Company's London office, has been transferred to Canada after investigating wolframite fields in Essexvale, Southern Rhodesia, and reporting on activities in Tanganyika and Uganda.

N. A. Gilberthorpe, formerly with Broken Hill South, Ltd., with its mine office at Broken Hill, New South Wales, Australia, is now a mining engineer at Radium Hill in South Australia.

H. E. Jackson has been appointed president of the British Non-Ferrous Metal Federation for 1953-54.

W. A. Coster, chief engineer of the Surinam Bauxite Company, Ltd., is visiting abroad, and while he is gone **H. A. L. de Hass** is replacing him.

L. E. Charlot has been added to the staff of Consolidated Mines Contract, Masinloc, Zambales in the Philippine Islands as assistant general superintendent. **W. G. Hippard** also has joined the firm's staff as mine superintendent.

Pierre Beauchemin, B. W. Newkirk, Jean Beauchemin, H. H. Racine, Joseph A. Beauchemin, P. Malouf and **B. Wheeler** have been elected directors of the Quebec Copper Corporation with headquarters at Montreal, Quebec.

Ivar A. Nilsson, Swedish electrical engineer, is in Yugoslavia to assist in electrification of rolling mills for producing steel and aluminum sheets and copper wire at the Rade Koncar works at Zagreb. Mr. Nilsson, sent by the United Nations Technical Assistance Administration at the request of the Yugoslavian government, will advise on machinery and other equipment needed for electrification, and will aid Yugoslav engineers in its installation, operation, and maintenance. Mr. Nilsson is plant superintendent for the Domnarfvet Iron and Steel Works in Sweden.

R. V. Wilson, former secretary of the Electrolytic Zinc Company of Australasia, Limited, has been appointed business manager. **J. A. Bult** succeeds Mr. Wilson as secretary of the firm.

J. de Beer, staff member of the O'okiep Copper Company, Limited of Namaqualand, is entering the Montana School of Mines at Butte, Montana where he will study for the Bachelor of Science degree in mining engineering. R. Gevers and P. du Toit, on the staff of the Tsumeb Corporation of South West Africa, are also studying at the Colorado School of Mines. **J. Venter,** Tsumeb staff member, has entered the University of Arizona where he will study for the B. S. degree in metallurgical engineering. O'okiep and Tsumeb have been sending staff members to American universities for further technical training for a number of years and it is expected that the program will continue.

U.S.A. Metal & Mineral Prices

METALS

November 16, 1953

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	29.50-30.00¢
	Lake. Delivered, destinations, U.S.A.	30.125¢
	Foreign Copper. Valley basis	29.50-30.00¢
LEAD:	**Common Grade.** New York	13.50¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	$166.50
ZINC:	**Prime Western;** F.o.b., E. St. Louis	10.00¢
	Prime Western; Delivered, New York	10.50¢
	Tri-State Concentrate, 60% zinc, per ton	$56.00
ALUMINUM:	**Primary 30 Pound Ingots (90% plus).** F.o.b. shipping points	21.50¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	35.00¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$2.00
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
COLUMBIUM:	**Powder** Nom., per pound	$75.00
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.00¢
MERCURY:	**Flasks.** Small lots, New York	$184.00-$186.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery., Port Colbourne, Ontario	60.00¢
TIN:	**Grade A Brands.** New York (Price per pound) Prompt delivery	82.00¢
TITANIUM:	**99.3%** + (Price per pound)	$5.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:		$91.00-93.00
ZIRCONIUM:	**Powder,** 100 pound lots, per pound	$7.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado	$45.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$46.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$34.00-$35.00
	Turkish. 48% Cr_2O_3, 3 to 1 chrome-iron ratio	$54.00-$56.00
	U. S. Government ore purchase depot Grants Pass, Oregon. Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.90
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$10.05
	Old Range Non Bessemer. Second quarter	**$10.15**
	Old Range Bessemer. Second quarter	$10.30
	Swedish, Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit	20.20¢
MANGANESE ORE:	**Metallurgical grade.** 46 to 48% Mn. Long ton unit	$1.15-$1.17
	Chemical grade. 80% MnO_2. Per ton	$70.00
	Domestic U. S. Government are purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treating costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2 F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$65.00
	Foreign. 65% WO_3 Per short ton unit	$50.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock. Per Pound V_2O_5,	$0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois- Kentucky mines	$42.50
	Mexican. 70% f.o.b. border	$30.00
	Acid Grade. 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado	$60.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

November 11, 1953

		Per Long Ton	USA Equivalent cents per pound[1]
COPPER:	**Electrolytic, spot**	£235 0d 0s	29.37¢
LEAD:	**Refined, 99.97%**	£93 10s 0d	11.69¢
ZINC:	**Virgin, 98%**	£75 10s 0d	9.44¢
ALUMINUM:	**Ingot, 99.5%**	£150 0s 0d	18.75¢
ANTIMONY:	**Regulus, 99.6%**	£210 0s 0d	26.25¢
TIN:	**Standard, 99.75%**	£622 0s 0d	77.50¢
TUNGSTEN:	**Long ton unit, 220s, equivalent to**		$30.80

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

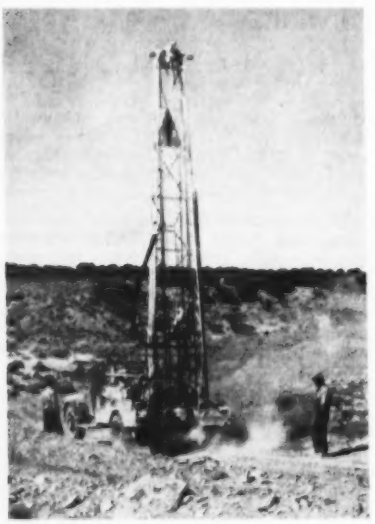
PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

Truck-Mounted 'Portadrill' Provides New Versatility

Finding increased application in open-pit, quarrying and exploratory drilling operations is the compact highly mobile "Air Blast" Portadrill manufactured by Winter-Weiss Co. of Denver, Colo. The unit is especially designed for fast drilling of vertical holes in a variety of mining applications, combining high penetration speeds with safety and economy under all operating conditions.

Mounted on a standard truck chassis of suitable capacity, the Portadrill is highly maneuverable on or off roads and is designed for vertical hole drilling



through hard rock as well as softer formations. Holes produced are straight, clean and uniform in diameter, with the equipment best adapted for 4¾", 5¾" and 6¾" sizes. Complete information can be obtained on this equipment by circling 78.

A New Wrinkle In Grouser Shoe Design

A revolutionary design of grouser shoe for crawler tractors has been developed by Engineered Equipment Company of South Gate, California. The new grouser, called the "Gripper," has curved and straight surfaces that produce a grouser bar with 15 percent more ground surface

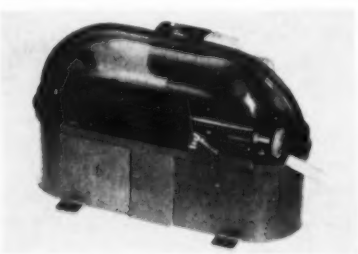
contact without a corresponding increase in total width or total weight.

The "Gripper" is made of 13 percent manganese steel and according to Engineered Equipment Company, its use will eliminate three to five replacement changes due to longer wear life and freedom from breakage. Circle No. 64 for further information.

Reagent Feeder Offers High Acid Resistance

Model E Reagent Feeder, made by the Clarkson Co., is now available in unplasticized polyvinyl chloride. This material has achieved widespread industrial acceptance because of its remarkable resistance to the corrosive effects of sulfuric, hydrochloric, and nitric acids, copper sulfate, ferric chloride, and many other chemicals.

This feeder offers unusual economy because of its low initial cost, and, because



of its high corrosion resistance, it eliminates frequent replacement or maintenance expenses. A highly accurate and thoroughly proven tool, this popular Model E Reagent Feeder is now being used in hundreds of industrial plants throughout the world. For Bulletin 541, giving additional information, circle No. 75.

35T Mack Truck to Haul Cerro Bolivar Iron Ore

Orinoco Mining Company, a subsidiary of the United States Steel Corporation, will begin operations of mining and hauling out iron ore from Cerro Bolivar, Venezuela, in January 1954. To aid in accomplishing this task, sixteen Model LRSW, 20-cubic-yard off-highway dump

trucks were ordered from the Mack Truck Company. These enormous trucks will carry 35 tons of ore per-load down the mountain side to a railhead.

To cope with the 8 percent grades, when running downhill under load, Twin Disc Converters and Parkersburg Hydrotarders are included in the special equipment features of these trucks.

IT'S FREE (No.) CIRCLE IT

Tractor Mounted Drill Has Flotation Drilling

The flotation drilling operation consists of feeding air and a small amount of water into the drill steel through the EECO double needle assembly. The air is automatically provided through the backhead; the water is regulated by a needle valve on the control panel. Enough water is provided to form a thick mud in the drill hole which is kept "boiling" by the air.

This system of drilling has been found to be very effective in broken and ravelly rock as it not only tends to line the hole and keep chips from entering, but it also floats and lubricates the chips that do get into the hole and thereby virtually eliminates stuck steel.

The drill assembly consists of a standard 4-inch drifter, standard wagon-drill feed motor, and a 23-foot drill track. The total travel of the drifter is 20½ feet, which allows drilling a full 20 feet without changing steel. Another operational feature of the EECO drill is its great versatility for drilling angular holes. It will drill any degree of a circle on either horizontal or vertical plane. The drill and boom are balanced so that they may easily be swung in a vertical plane, making it a one-man operation.

The Eugene Engineering Company of Eugene, Oregon, have published 2 pamphlets completely describing the EECO drill and the required specifications for the tractor, power takeoff, compressor, and water tank. You will want both of these pamphlets for ready reference. Circle No. 67.

AIR-TO-HYDRAULIC POWER CONVERSION: Ohio hydraulic pumps are designed for continuous service in providing smooth hydraulic pressure where compressed air is available. Get Ohio's bulletin on these 35-pound portable converters. Circle no. 24.

RR DUMP CARS: Specifications for both 30- and 50-yard Western air-operated railroad dump cars are covered in Bulletin #5000, recently released by Baldwin-Lima-Hamilton. Illustrations portray the special features that enable the cars to stand up under long-term hauling and dumping with a minimum of maintenance. Circle no. 16.

CABLE-LINK CONVEYORS: Cable-Link conveyor systems, made by the Cable-Link Corporation, incorporate entirely new and highly original engineering developments. These unique installations are now finding wide application in bucket-elevators and apron conveyors with resulting savings in first cost and maintenance. Get Cable-Link's six-page brochure by circling no. 19.

DIESEL MAINTENANCE: The ninth in the series of cartoon-style instruction booklets published by Caterpillar features the maintenance of D397, D386, D375, and D364 engines, marine engines, and electric sets. This new Diesel maintenance guide treats all phases of engine care with Caterpillar's usual thoroughness.. Circle no. 27.

FILTERS FOR EVERY PROCESS: The Eimco Corporation maintains a development and testing department staffed with expert chemical and metallurgical engineers, enabling Eimco to offer filtration equipment exactly suited to any process. Circle no. 48.

CONTINUOUS WEIGHERS: The complete line of Transportometer continuous, automatic weighing scales is covered in a new 8-page bulletin published by the Sintering Machinery Corporation. For your copy, circle no. 33.

NEW TUNGSTEN CARBIDE BIT: Users of Liddicoat single-use bits can now take advantage of quickly switching to interchangeable tungsten carbide insert bits when changing ground conditions warrant. Western Rock Bit Manufacturing Company has announced the new Tee Cee Liddicoat bit, built to fit the same steel as the single-use Liddicoat. For detailed information, circle no. 47.

"HOLLOW DRILL STEEL MAKES HEADLINES": That is the title of a new booklet released by Bethlehem Steel Co. Many mining projects are featurel and illustrated to explain applications and advantages of Hollow Drill Steel. Receive a copy by circling No. 29.

SHOVEL HANDBOOK: A new "Operator's Handbook" for cable and hydraulic shovels has been released by Caterpillar Tractor Company. Following the popular cartoon-style pattern used so successfully in ezrlier editions, the booklet's illustrations explain thoroughly operation of the shovel in a variety of situations. Circle no. 46.

RUGGED RAILWAY CARS FOR EXPORT: That's the Gregg Company's specialty. They design and build cars to meet customer needs or standard railway specifications of countries served. For further information circle no. 17.

NEW SLURRY PUMPS: The problem of pumping finely divided, highly abrasive solids over a wide range of heads and capacities has led Georgia Iron Works Company to design a completely new line of pumps for the job. Get their illustrated booklet by circling no. 18.

LONG ON POUNDS OR FRANCS? A new booklet published by Caterpillar Tractor Co. tells how you can put your foreign currency to use in the purchase of Cat-built products. Many nations are finding it difficult to buy Caterpillar products from the United States due to the lack of dollars and import permits. Booklet (Form 30722) describes the four foreign manufacturers licensed by Caterpillar. Circle No. 1 to get your copy.

BETTER BLASTING: First issue of a new quarterly technical bulletin, designed to assist mine and quarry operators, construction engineers and other users of industrial explosives has been published by the Atlas Powder Company. The four-page illustrated bulletin, titled "Better Blasting," describes modern blasting techniques in practical, readable fashion. No. 2 is the one to mark.

PERFORATED METALS FOR EVERY USE: Diamond Manufacturing Co.'s new two color catalog illustrates and describes a complete line of perforated products for many modern industrial, architectural and ornamental applications. It also gives hole sizes, open areas, gauge limits and other useful information for engineers and designers. Your request for Catalog 39 will gladly be filled if you circle No. 3.

READY ANSWERS FOR PIPE USERS are to be found in the new catalog and book of engineering data tables just issued by Stainless Welded Products, Inc. This illustrated catalog covers the complete line of SWEPCO large diameter, corrosion resistant pipe, tubing, and welding fittings. The Engineering Data Tables provide ready facts and formulae. Many of the tables are unobtainable elsewhere. Circle No. 4 to get your copy.

NEW SCALPING SCREEN: Link-Belt Co. has announced a new heavy duty scalping screen for fast economical scalping of ore, rock, and similar materials. Included among the many features are a rugged deck to handle the high impact of large boulders, full floating vibrator mechanism, and automatic controls that limit excessive vibration during resonance. Link-Belt Folder No. 2461 is yours for the asking. Circle No. 5.

UNIVERSAL METAL DETECTOR: RCA's new electronic metal detector indicates *any* kind of metal or alloy, magnetic or non-magnetic—including manganese, steel, copper, aluminum, stainless steel, or brass. It is easy to install and will operate at conveyor speeds from 25 feet to 1000 feet per minute. Circle No. 6 for RCA form E 42.

PRIDE OF THE PIT is how P & H describes its line of Electric Shovels in a new full color brochure. It covers all models included in their Large Excavator Division from the 1055 to the new 1855. This beautifully illustrated folder will be sent if you circle No. 7.

ERRORS AND HAZARDS ELIMINATED: The demand-type oxygen and air masks and apparatus supplied by Mine Safety Appliances Co. of Pittsburgh now include speaking diaphragms. This new

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to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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DECEMBER 1953 — NOT GOOD IF MAILED AFTER FEBRUARY 25

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addition will promote efficiency and eliminate the errors and hazards that may result from "lack of liaison." Details on the demand masks and apparatus with speaking diaphragm facepieces are available—just circle No. 10.

EXPLOSIVE FACTS: A comprehensive new 48-page book and catalog titled "Atlas Explosives Products" is now available. This two-color file-size booklet includes more than 80 illustrations and covers underground and strip mining as well as many other major industries. You'll definitely want this one for your files. Circle No. 11.

THINKING OF MAGNETIC SEPARATORS? Dings Magnetic Separator Company offers a complete line to meet your special problems. For further information on this subject mark No. 12.

PRODUCTION AT A PROFIT: Traylor Engineering & Manufacturing Co. explains the economy of operation and lower maintenance costs in Bulletin 7112 on Traylor TY Reduction Crushers. Circle No. 13 and get your copy.

ARE YOU UP TO DATE? WEMCO's new bulletin contains valuable, up to date mineral engineering information on wet classification principles and their application to Wemco S-H Classifier design. It provides a store of useful information for ready reference. Circle No. 14.

SLUSHINGEST BUCKET: That's the way Alloy Steel and Metals Co. describe their Pacific Slushmaster Scraper. Bulletin No. 215 describes the complete line of nine different models from 26" to 60" widths. Circle No. 15 and get your copy.

FILTRATION TROUBLE? Oliver United Filters Inc. offers the largest variety of filter types from which to select. Bulletin M-20 offers details of the several different types of Oliver Filters. Circle No. 20.

ACCURATE SCREEN ANALYSIS: The Wheeler Testing Vibrator will grade coarse or fine material in sieves from six to sixteen inches in diameter. It is a compact unit with many special features. Circle No. 9.

NON-CLOG SOLIDS PUMP: Morris Type-M Solids Pumps will handle solids ranging from fine abrasives up to pieces 11 inches in diameter. The low-speed reduces the abrasive action of the smaller particles, the large clearance allows larger solids and "tramp" pieces to pass without trouble. Check No. 21 to get Bulletin 175 on the Type M Solids Pump.

SAMPLE ORE BAG: Bemis Brothers Bag Co. offers a sample ore bag and detailed information on its waterproof (laminated-textile) ore bags. Specify type of ore and check No. 22.

JEEP MOUNTED DIAMOND DRILL: Acker Drill Co., Inc. offers details on its new model TS Acker Screw Feed Diamond Bit Drill. Included among the many features are a power take-off drive for jeep or truck and a built in water pump with separate clutch. Circle No. 23 for Bulletin MW.

ATTENTION PROSPECTORS! Ultra-Violet Products, Inc. will send you their brochure MW on "Prospecting for Scheelite (tungsten) with Ultra-Violet." Also the details on their Mineralight models for every requirement. Get your copy by circling No. 25. For an *Actual Atomic Blast Sample* of new mineral specimen from the 1st atomic blast at Almogordo, New Mexico, send 25c to: Ultra-Violet Products, Inc., 145 Pasadena Ave., South Pasadena, Calif.

DON'T OVERLOOK THIS! Illustrated literature is available on Kleenslot wedge-wire preparation screens that operate on a non-clogging principle. Accurate openings, great strength and long life make Wedge-Wire screens front line products. Check No. 26 for further information.

HINGED FOR LONGER WEAR: Massco-Grigsby rubber pinch valves have recesses molded into opposite sides of the sleeve to serve as "hinges" during compression. This feature prevents undue strain and eliminates breakage due to valve adjustments. For the Mine & Smelter Supply Co. catalog on these rubber pinch valves circle No. 28.

CUT FROTHER CONSUMPTION: The ability of Dowfroth to build higher quality froth more economically is well established. Dowfroth 250 is essentially free of collector properties, making it particularly effective for selective flotation. A *free sample* of Dowfroth 250 may be obtained by writing Dow, Dept. OC 3-35A. The Dow Chemical Co., Midland, Michigan.

BETTER PUMP SERVICE: Vacseal Pumps, built to handle all types of abrasive and corrosive pulps, embody the patented Vacseal design which prevents solids from entering the gland. Bulletin BP-52 describes the full line of Vacseal Pumps. Circle No. 30.

SPECIAL MAGNETS FOR YOUR OPERATION: Whether your magnetic needs require standard magnets or specially designed magnets, Ohio Electric Mfg. Co. is prepared to serve you. Circle No. 31 for more detailed information.

REBUILD CRUSHER PLATES TO YOUR OWN DESIGN: Every operator of crushing equipment has wanted many times to alter the crushing surfaces of the jaw crusher to more efficiently handle the material being crushed. Now Resisto-Loy Co. of Grand Rapids, Michigan will rebuild any worn standard crusher plate to your own style or design and at a cost that is not prohibitive. Check No. 32 now for further information.

HOW'S YOUR CHOW? Employee feeding, mechanical maintenance, employee housing, recreation, sanitation, or complete community management is the specialized business of Universal Services, Inc. It has the operational know-how, experience, and personnel to do a superior job of looking after these things for you. Circle No. 51.

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New Plant at Issaquah For Washington Iron Works

One of the most important products of the Washington Iron Works through many years has been gold dredges for mining operation. These were built for many big operations in Alaska, California, Montana, Idaho and elsewhere. While inflation and its effect upon the gold mining industry has lessened the demand for this type of machinery, it is still a branch of the business that may later be revived on a considerable scale.

The present 8-acre plant in the South End of Seattle has reached the limit of further expansion, and yet the growth of the Washington Iron Works business and increasing diversity of products is such that further plant expansion is a keen necessity. As a result they have taken an option on a much larger site of 77 acres near Issaquah and the south end of Lake Sammamish, 12 miles due east of Seattle, where they plan to build a new, modern plant capable of taking care of their present and future production.

John M. Frink, the founder of the company, was very prominent in early Seattle's civic affairs, serving for a number of years as president of the Park Board during which time he gave Frink Park to the city. He was succeeded in the active management of the business by his two sons, Gerald Frink, now president and Francis Frink, Sr. vice-president, who are still the senior executives in the concern.

Torque Converter Reduces Clutch and Gear Work

The addition of an hydraulic torque converter has greatly improved the performance of the Hough Model HM "Payloader" tractor-shovel. The converter is a 3-element-type which multiplies the torque output of the engine in direct proportion to the load requirements.

The torque-converter, by greatly reducing the amount of clutching and gear-shifting needed, also materially reduces the amount of effort and concentration previously required of the driver. This drive acts as a cushion for the entire power train, thus protecting these components against load shocks, reducing maintenance, and prolonging the life of the unit.

Many users have field-tested these new models and have reported most favorably concerning the operation and advantages of the torque-converter. Full details can be obtained by circling No. 76.

IT'S NEW (No.) CIRCLE IT

New Facilities Announced By Copco Pacific, Ltd.

Completion of a new building at Phoenix, Arizona, to accommodate its expanded Southwest sales offices and warehouse stocks has been announced by Copco Pacific, Ltd., rock drilling equipment distributors. The new structure is located at 1326 N. 22nd Avenue. Phoenix is one of four branches maintained by the firm, whose headquarters are at San Carlos, California, and is the sole western source for Atlas Rock drills and Coromant Drill steels.

SILVER CAMPS

(*Continued from page* 58)

and Smelting Company began the construction of the Grandview Smelter. On November 7th the smelter blew in and thereafter produced high-grade bullion from Rico ores. Two years later the Rico Mining and Smelting Company erected a second smelter in the lower end of the town. Yet even with its mines and a resident population of 894, "every passenger, pound of freight and the mails and express . . . have now to be packed by "Burro Punchers" on the back of the ass or broncho ponies at an expense of from four to ten cents per pound." (Crofutt's *Gripsack Guide*, 1881).

David Swickheimer went to Rico after the first boom started and, while his wife kept boarders, he did hauling and other odd jobs. Like all men in a mining camp he dabbled in prospecting. In 1887 he located a claim just above town on Newman Hill and named it the Enterprise. The couple put every dollar into its development until their money was gone and they were completely discouraged. It was then that Mrs. Swickheimer spent one dollar for a Louisiana Lottery ticket and to her amazement won $5,000. She insisted that the money be used to develop the property, with the result that at a depth of 2,621 feet a rich blanket of silver ore was uncovered. The Enterprise was soon one of Colorado's richest mines. In 1891 the couple sold the Enterprise to Crawford and Posey for $1,250,000. The new owners disposed of it to a syndicate of New York and English capitalists, who formed the Enterprise Mining Company and made of the mine the biggest bonanza in the vicinity.

The silver crash almost finished the place. The mines closed, houses were torn down and only 150 persons stayed in the entire district. But Rico gradually came back.

In 1898 the Knight Investment Company of Utah got possession of the Wellington group of mines on Telescope Mt., and other companies bought up old properties including the Black Hawk, Yellow Jacket and Argentine and reopened them. Before long, however, litigation between the Rico-Consolidated and the Rico-Argentine companies shut down the camp entirely. By 1900 only an occasional leasor shipped.

In 1902 practically all the mines were consolidated under the ownership of the Rico United Mines Company, which developed the large quantities of zinc found in the several properties. By 1905 the zinc deposits had caused the camp to stage a revival. Since then lead and zinc have been mined more or less steadily.

In 1920, Robert L. Pellet formed the Falcon Lead Mining Company, backed by eastern capital and began the devlopment of holdings on Nigger Baby Hill. The same year the Pro-Patria, Rico-Wellington and Rico-Consolidated properties reopened. By 1926, 14 mining properties were active and Rico's population had grown from 2 (in 1900) to 800. Mining was at a low ebb in 1929 and 1930 when the price of metals was low but, by 1933-1934, another slight revival occurred when the Pell-Eyre mine operated with 30 men. Of recent years, most of the work done has been by the Rico-Argentine Mining Company, which in 1939 completed a differential flotation mill to handle its output. In 1950, when I last saw the camp only one company—the Rico-Argentine—was operating.

Dolores, Telescope, and Expectation Mountains and Newman and Nigger Baby Hills are still full of mines; David Swickheimer whose Enterprise made Rico is dead; and it is 41 years since the people of Rico heard "The Great Commoner," William Jennings Bryan, speak of silver, when his election "Special" stopped at the little mountain station for 20 minutes. Rico has ceased to boom but it is still alive.

precipitates—CENTRAL and EASTERN

MINING MEN DISCUSS DRILLING TRENDS DURING 5th ANNUAL MINNESOTA MEETING

Representatives of drilling contractors, mining firms, government agencies, and manufacturers participated in the Drilling Symposium held at the University of Minnesota in Minneapolis, October 6 through 10. During the three-day session, more than 15 papers were presented on subjects ranging from diamond drilling on the Colorado Plateau to hard-faced bits versus tungsten carbide bits.

One of the significant results of drilling research in the past few years was clearly brought out during the three-day meeting. That is, the amazing way the mining industry has met the challenge of large-scale drilling in remote areas. The mechanization of drills and the ever-increasing tendency toward drilling mediums other than water, as well as new sampling methods, have been the answer.

A discussion of the progress in diamond drilling research was held Thursday afternoon. At that time Albert G. Long of the Mines Research, U. S. Bureau of Mines, Bluemont, Virginia, and E. P. Pfleider, associate professor of mines and metallurgy at the University of Minnesota, told of their research in the field of diamond orientation in drill bits. The diamonds are sorted according to their crystalline habit and then placed in the bits with varied orientations. The bits are then used for extensive test drilling in granite and the results are carefully compared.

The steadily growing use of mud as a medium in diamond drilling was the subject of the Friday morning session. The mud, which is a mixture of bentonite and water, is pumped down the water hole in the drill rods. As the mud returns to the collar of the hole, it carries out the drill cuttings and cements the wall of the hole.

The special bentonitic clays for drilling mud are available in 100-pound units. Consumption under average conditions is about four pounds of bentonite per foot of hole drilled with an AX bit. The water-bentonite ratio is about four gallons to three pounds.

After lunch Friday, Diesel power for diamond drilling was discussed. At the present time, the gasoline engine is the most widely used source of power for surface diamond drills. However, the Diesel engine is rapidly gaining favor due to its greater efficiency and economy of operation. The efficiency of the Diesel engine is 38 percent as compared to 28 percent for the gasoline engine.

Robert R. Carver of the Grand Junction office of Sprague and Henwood, Inc. told of one of their drills in Pennsylvania that was powered by a Buda 4DT 226 Diesel engine. BX holes as deep as 3,400 feet were drilled during 34 months of operation. The total operational cost for the Diesel engine during that time was $165.00. This cost did not include lubricating oil, filters, or fuel. An average of five gallons of fuel oil was consumed per 8-hour shift. The price of the fuel oil, delivered at the job site, was $0.125 per gallon. The total fuel cost per 8-hour shift was $0.625. Gasoline engines used on diamond drill rigs in the same area had fuel costs that averaged $3.50 per shift.

It was also mentioned that Diesel-powered diamond drill rigs operating in the Colorado Plateau area were turning in some good performances. Diamond bit wear was reduced and a higher percentage of core recovery was noted by operators who had changed from gasoline to Diesel units for core drilling.

GSA Halts Contract With Westmoreland Manganese

The General Services Administration has canceled its manganese production contract with Westmoreland Manganese Corporation of Batesville, Arkansas, on the ground that the company "defaulted" on the terms of the contract. No concentrate was delivered and the construction called for had not been delivered.

The contract, signed in April 1952, provided for production of 264,000 tons of manganese concentrate within six years after production began, or by June 30, 1959. To date the government has advanced $2,800,000 out of $3,807,250 it had agreed to appropriate for construction equipment and land purchases.

At a conference earlier this year with GSA representatives, a solution to the firm's financial problems was worked out. At that time, the contract was amended so that foreclosure could take place without the 60-day period originally specified, if it appeared that the foreclosure would be necessary. The GSA has now served notice that it will "take immediate possession of the facilities and properties covered by the mortgage securing advances heretofore made."

Prospect drilling is under way on the Milford Farm north of Desloge, Missouri, owned by Dr. Harold C. Gaebe and Otto

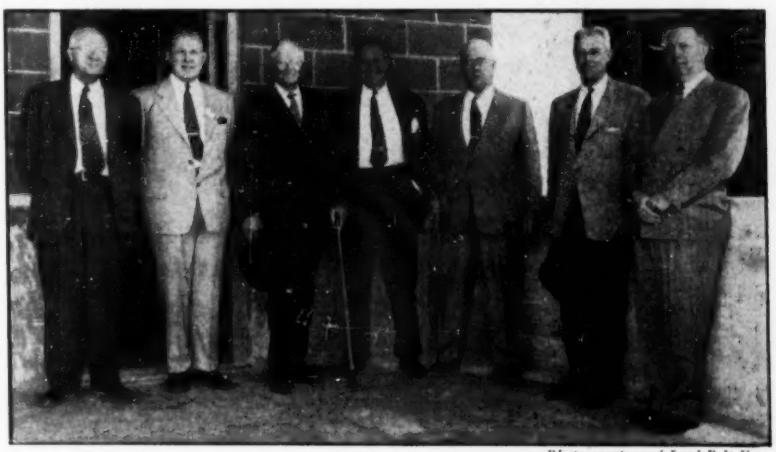


Photo courtesy of Lead Belt News

ST. JOSEPH LEAD OPENS NEW MINE

Officials of the St. Joseph Lead Company were on hand for the dedication of the new Indian Creek mine, 10 miles northwest of Potosi, Missouri, recently completed after more than two years of construction. Left to right are: B. F. Murphy, retiring general manager of the company; Elmer A. Jones, division manager of the southeast Missouri properties; Clinton H. Crane, New York, chairman of the board of trustees, who served more than 35 years as president of the company; Andrew Fletcher, New York, president of the company, who succeeded Mr. Crane; C. K. Bain, Bonne Terre, who had charge of the Indian Creek project; Francis Cameron, New York, vice president of the company; Fred M. Kleppsattel, Bonne Terre, business manager of the southeast Missouri division. Indian Creek's new, 1,000-foot circular shaft is concreted from top to bottom; a hoist driven by a 600-hp. motor hoists the 8-ton skips. The mill will treat 2,500 tons of ore per day, assaying about 4 percent lead. Concentrates will be hauled to Potosi for rail shipment to the smelter at Herculaneum, Missouri. A 750-foot shaft will be sunk east of the present shaft to serve as a supply, ventilation, and escape shaft.

Ratley of Flat River. Samples of dolomite are being obtained, and determinations of the type of formation and possibilities of lead are also being investigated. The farm has never been drilled before. It is completely surrounded by the *St. Joseph Lead Company* holdings, because the underground rights to the *Valley Dolomite Company* property on the east are held by St. Joseph. The Desloge mill is located on the south side of the Milford tract. Drilling for lead is being conducted in about the center of the property, a half mile from the St. Joseph company's line.

The government is concerned over the shutdowns and slowdowns in zinc smelting operations as they affect the production of germanium. If the present trend in the zinc industry continues, shortages in germanium will be felt within a year. The *Eagle-Picher Company* is the principal producer. It had been the sole producer for some time, but by the end of 1954 about 10 germanium producers are expected to be in the field. Eagle-Picher output is reported to be down 63 percent. Germanium is so rare that only one pound is recovered from every 2,500,000 pounds of zinc ore handled at Eagle-Picher's Henryetta, Oklahoma plant.

After nine weeks of strike, the *Ozark-Mahoning Company* employees are back at work at the Rosiclare, Illinois, fluorspar operations. Although only employees working at the mill were on strike, the mines were forced to stop operations because of the lack of storage space for the ore.

Mining operations at the *Dardene* lease near Picher, Oklahoma have been discontinued by order of the assistant state mine inspector. Joe and Don Cox and Clarence Howell, operators of the mine, lost their permit to continue lead and zinc production because of alleged illegal mining practices. They were accused of using a gasoline engine underground which would release carbon monoxide. All gasoline equipment is unlawful underground by state edict. Diesels with exhaust gas conditioning equipment are approved by the Oklahoma mining division.

Substantial progress is being made by the *International Minerals & Chemical Corporation's Consolidated Feldspar Department* in the *Industrial Minerals Division* where an expansion program is under way. In addition to planning three new plants, existing equipment is being enlarged and brought up to date. Power generating equipment is being replaced with new and larger units; dust collecting and water clarification systems are being installed. Flotation capacity of Spruce Pine, North Carolina mill has been increased by 50 percent, and new fine-grind facilities installed at Erwin, Tennessee. The main quality-control laboratory at Kona, North Carolina has been revised and enlarged.

Selenium imports are continuing the downward trend started in 1951 and may be well below 100,000 pounds in 1953. Domestic production, although rising, is not increasing as fast as the upward trend in consumption. Domestic production has risen from 494,912 pounds in 1951 to about 800,000 in 1953. Domestic consumption is currently about 800,000 pounds but may reach 1,250,000 pounds this year. The import decline is attributed to the higher prices offered in Europe where $18 to $25 a pound is the reported price with United States prices ranging from $4.50 to $6.00.

Unexpectedly long delays in getting the non-ruby mica buying program started at Spruce Pine, North Carolina were caused by difficulties in obtaining the "Q" meters for testing the mica deliveries. Two "Q" meters are now in use, however, and the government depot is able to handle the material.

The biggest dragline in Florida and one of the largest in the world is being assembled at the *Noralyn* mine of *International Minerals & Chemical Corporation Florida Phosphate Division* for operation there next year. The new machine will have a bucket capacity of 26 cubic yards; this slightly surpasses the 21.5 cubic yard "Bigger Digger" in operation at Peace Valley. The 650 B dragline now

working at Noralyn will be moved to the *Achan* mine.

The *Deer Park* mine in the area near Spruce Pine, North Carolina being reopened for mica and feldspar production. New York City interests are reported to have acquired the mineral lease from *United Feldspar and Minerals Corporation. Carolina Power & Light Company* has extended a power line into the property to serve the operation, and additional equipment is being brought in to speed operations.

The United States Geological Survey has released a map which shows airborne radioactivity anomalies detected along parts of the Atlantic Ocean beach from Cape Henry, Virginia to Cape Fear, North Carolina, and from Savannah Beach, Georgia, to Miami Beach, Florida. The anomalies may or may not indicate the presence of uranium or thorium. The Geological Survey has undertaken the survey throughout the United States on behalf of the Atomic Energy Commission. The radiation-detection equipment is mounted in a Douglas DC-3 airplane which flew along the beach at an elevation of 500 feet. The map is available at offices of the Geological Survey in Tallahassee and Plant City, Florida for reproduction. Inspection copies are at numerous offices throughout the nation.

Davison Chemical Corporation is carrying out a reclamation program in the Lakeland, Florida area where the company mined phosphate. The mounds and pits left by these operations are being leveled and the area will be landscaped.

The *United States Geological Survey* has released geological maps of some kyanite deposits in Virginia, North Carolina, and South Carolina by G. H. Espenshade and D. B. Potter. One covers kyanite quartzite in the Baker Mountain-Madisonville area of Prince Edward and Charlotte Counties, Virginia; another, kyanite quartzite in the Willis Mountain-Woods Mountain area of Buckingham County, Virginia. One covers geologic mapping of Henry Knob, York County, South Carolina, while geologic maps of the Reese Mountain-Clubb area of Lincoln and Gaston Counties, North Carolina and York County, South Carolina, are also included in this series.

North Range Mining Company has purchased the complete ore beneficiation plant owned by *Zontelli Brothers* and plans to move it to the *Book* mine near Crystal Falls, Michigan for operation at the start of next season. First to be treated will be the tailing from an old jig plant operated at the Book mine about 20 years ago. Following that, current underground production will be put through the plant. Zontelli erected the plant at the *Penokee* mine at Ironwood, Michigan in 1949. It consists of screening, washing, jigs, and an HMS Mobil mill. The plant had been treating old dumps from underground operation during the past 60 years.

Construction work on both the Humboldt and Republic mills of Cleveland-Cliffs Iron Company in Michigan is pro-

gressing. The Humboldt flotation plant should be ready for operation shortly after the first of the year. All major equipment items have been installed in the mill and the primary crusher is now being located. At the Republic plant, excavations have been completed for the crushing sections and concrete is being poured. A single-section flotation plant is being installed at Humboldt with a capacity of approximately 70 tons per hour of feed, while Republic will have a two section plant, each section being about the same size as Humboldt.

Among the smaller mines making initial shipments during the 1953 season was the *Michael* mine near Buhl, Minnesota, operated by the *Sylvia-Dee Mining Company*. The open-pit mine is located adjacent to the *Judson* mine. David D. Haley is president of Sylvia-Dee. Also making first shipments this season was the *Ernie* mine operated by the *E. A. Young Mining Company* north of Virginia, Minnesota.

Adjacent to the *Michael* mine a new open pit is being planned by the *Haley-Lacollo Mining Company*. This new firm plans to develop and mine on two forties known as the *Jennings* tract, owned by the *Jennings Trust Company* of Pittsburgh, Pennsylvania.

A new crusher and conveyor are being constructed at the Mahnomen No. 1 pit of *Pickands Mather & Co.* on the Cuyuna Range in Minnesota. Holmes Erection Company is doing the work. When completed, the total length of the new facilities will be approximately 1,500 feet and at a slope of 18°. Ore from the open pit will be crushed and conveyed to the present loading pocket located on the surface.

Three new cyclone plants are planned for operation on the Iron Range at the start of the 1954 season. The *Western Mining Company* has entered into a contract with *Western-Knapp Engineering Company* for the construction of a 160-long-tons-per-hour cyclone plant at the *West Hill* Mine to supplement the washing and heavy media plant completed this spring. The *Cuyuna Ore Company* has also authorized Western-Knapp to construct a cyclone plant along with a heavy media and wash plant at the *Mahnomen* mine property near Crosby, Minnesota. M. A. Hanna Co. will construct a 50 to 60 long-tons-per-hour cyclone plant at the *Morocco* property near Crosby. This will bring to 10 the total number of cyclone plants operating on iron ore in Minnesota.

Skubic Brothers plant located in the *Virginia* mine near Eveleth, Minnesota, is now receiving ore by rail shipment from the *Ajax* mine near Aurora, Minnesota. The ore is hauled in by rail, treated in the heavy media and jig plant for concentrates, and shipped out by rail to the docks in Duluth and Superior. This operation is similar to the procedure at the Eveleth concentrator of the *Coons-Pacific Company* and the Virginia concentrator of W. S. *Moore Company*. It is becoming popular with many of the smaller operators with diversified properties.

The *Buck* mine operated by *Pickands Mather & Co.* for the *Verona Mining Company* at Caspian, Michigan was the winner of the underground metal mines division of the U. S. Bureau of Mines 1952 "Sentinels of Safety" contest. A total of 685,388 man-hours was worked at the mine without a lost-time accident.

precipitates—NORTHWEST

Northwest Mining Assn. Meets Dec. 4, 5 in Spokane

The 1953 convention of the Northwest Mining Association will be held December 4 and 5 in Spokane, Washington's Davenport Hotel. Karl W. Jaspar is general chairman, and E. C. Stephens is program chairman.

Seven sessions will be crowded into the two-day meeting in order to cover a wider variety of subjects. The Columbia section of the American Institute of Mining and Metallurgical Engineers and the Canadian Institute of Mining will sponsor some of these meetings.

Frank Marr, Association president, will open the first general session with a discussion of mining in relation to national affairs. Work of the United States Bureau of Mines and the United States Geological Survey will be featured at two sessions with M. E. Volin of the Bureau of Mines and A. E. Weissenborn of the Geological Survey presiding. The AIME technical sessions will be chairmaned by J. C. Kieffer, president of the Columbia section, and Lowell Moon, Bear Creak Mining Company geologist.

C. H. Mitchell, editor of the *Western Miner*, Vancouver, British Columbia, is arranging the Canadian Institute's session, while P. Evan Oscarson will be chairman of a session devoted to problems of changes in mining land laws.

On the social side, a Miners' Soiree, featuring a dinner and dance, will be held on Friday evening; the annual "Sourdough Breakfast" for men only will be held on Saturday morning; the annual AIME-NWMA joint luncheon is scheduled for Saturday noon; and the convention banquet that night.

The women's auxiliary of the AIME will sponsor a ladies' Brunch and a coffee hour during the convention.

Officers of the NWMA will be elected by the trustees at a pre-convention meeting on December 3. Resolutions and honorary membership committees will also meet at that time.

Hanna Nickel Manager Tells Of Future Operation Plans

Hanna Nickel Smelting Company's Oregon operations are expected to continue for 30 to 40 years with present ores which are on the surface of Nickel Mountain, outside of Riddle in Southern Douglas County, according to Earl S. Mollard, manager of the operations. Other facts which Mr. Mollard revealed in a recent speech to the Roseburg, Kiwanis Club were: about 400 persons will be employed during full production; five electric furnaces, four for ferro-nickel production and one for ferro-silicon, will be in production beginning in the summer of next year; the plant will process 10 carloads of raw materials each day with one carload of finished product ready for shipping in the same period; all mining operations will be open pit with tractors and bulldozers; 25 pounds of ferro-nickel will be extracted from each ton of low-grade ore; and 1,800 tons of ore will run through the plant each day.

Mollard also told club members that the company will use 65,000 kilowatts of power and small amounts of water, mostly for cooling. Two miles of railroad spurs have been constructed at Riddle. Slag from the furnaces will be piled on the company land. An aerial tramway from the mining operations will carry ore to the plant in a continuous operation. The company plans to run three shifts a day, seven days a week.

Two Idaho Properties Are Explored By Bear Creek

Bear Creek Mining Company, wholly owned subsidiary of Kennecott Copper Corporation, is currently investigating two old mining properties in west central Idaho.

One is the IXL copper prospect in Washington County, owned by interests in Weiser, Idaho. The 47-claim group had been idle since 1947. Geologic mapping is being conducted first.

In Idaho County, the firm has completed a diamond drilling program at the Duerden zinc property near Burgdorf, owned by a group in Portland, Oregon. Five holes were drilled for a total length of 2,000 feet. The zinc ore occurs as a replacement deposit in limestone in a roof pendant in the middle of the Idaho batholith.

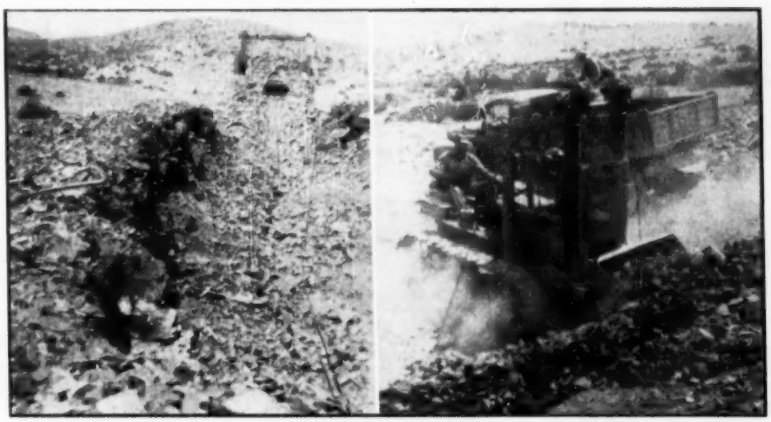
Queen of Bronze To Ship Copper To Japanese Firm

The Queen of Bronze mine in Takima, Oregon, will ship approximately 30,000 tons of copper concentrate and ore during the next two years to Nippon Mining Company in Japan under a recent contract negotiation. North American Mineral & Metal Corporation, in conjunction with Tokyo Merchandise Company Ltd. and Nippon Mining Company, has signed the longterm contract with Waite Minerals, Inc., of Grants Pass, Oregon to reopen the mine.

First operation planned is to leach the copper from about 200,000 tons of dump ore containing from 1.5 to 4.0 percent copper which has accumulated at the mine during previous operations. New tanks and other equipment have been installed and the leaching plant is expected to produce copper precipitate at the rate of approximately 8 to 10 tons daily. The precipitate will average about 75 percent copper.

Reopening and mining of several of the stopes will also be undertaken. The mine was last operated extensively during the early part of this century, and has only been worked intermittently since 1910. Driving of about 1,800 feet of tunnel was completed during these earlier operations.

Diamond drilling is also being conducted at the western end of the property where indications of additional copper ore have been noted.



IRON CROSS SHIPS TO CEMENT PLANT

Ralls and Harris Bros. are mining an outcrop of magnetic iron ore located on Cedar Plains about 3 miles northwest of Radersburg, Montana. The claims were originally owned and operated by W. A. Clark around 1860 to 1870 and the ore shipped to a smelter for flux. Relocated again in 1945 by John M. Ralls, George W. Harris, and Cloyd C. Harris, the Iron Cross is being mined by stripping and open pitting. A hoist, whose power is supplied by a Ford industrial engine, pulls the slusher bucket (in the cut at left) up the ramp to fill the elevated ore bin. In another section of the pit, a Traxcavator is used to load the trucks (shown at right). Stripping is done by the "cat" with a bulldozer blade attached. Holes up to six feet are then drilled with an Atlas Jackhammer, loaded, and blasted. Two trucks haul ore to the Ideal Cement Company in Trident, Montana, where the iron is used in making certain types of cement. More than 35,000 tons of ore have been taken out, with regular shipments averaging about a carload per day.

NORTHWEST PRECIPITATES

IDAHO

Bunker Hill & Sullivan Mining and Concentrating Company has put new charge-preparation and pelletizing plants into operation at its Bunker Hill smelter at Kellogg, Shoshone County, Idaho. The new facilities are part of a multi-million-dollar modernization program. The new crushing and fine grinding plant was placed in operation last June. Construction of a new 202-foot stack is nearing completion. The company's *Crescent* mine shaft deepening project on Big Creek had reached the 2000-foot level at last report. J. B. Haffner is general manager.

Sullivan Mining Company's multimillion-dollar sulphuric acid recovery facilities are nearing completion at its electrolytic zinc plant near Kellogg, Idaho. Construction, started in August 1952 by *Stearns-Rogers Construction Company* of Denver, is scheduled for completion late in January. The new facilities will convert sulphur dioxide fumes from the zinc plant into 250 to 300 tons of acid daily. Already completed are a second thawing shed for frozen zinc concentrates, 18 concrete storage bins with a total capacity of 18,000 tons of concentrates, and a pre-treatment plant for removing magnesia and lime from zinc concentrates received from Metaline Falls, Washington, operations of *Pend Oreille Mines and Metals Company*. Wallace G. Woolf is superintendent.

Golconda Lead Mines found some zinc ore unexpectedly in its easterly 1800-foot level exploration drift. The mine is east of Wallace in the Coeur d'Alene district, Idaho. Principal objective of the work is downward extensions of high-grade lead-silver shoots lying about 800 feet ahead. Wray Featherstone is mine manager.

The DMEA has granted Verlon W. Vandeventer of Fresno, California, a 90 percent monazite exploration loan for a $2,285 churn drilling project at *Hull's Big Creek* property in Valley County.

Polaris Mining Company's $685,955 East Exploration project in the Coeur d'Alenes of Idaho is being carried out on a three-shift basis following six weeks of preparatory work. The two-mile-below-sea-level drive was started from the face of an old exploration drift driven 500 feet from Polaris' Silver Summit mine into the adjoining property of Merger Mines Corporation. Preliminary work included laying of rail, air pipe, ventilation pipe, and electric cable; also some cleanup work and retimbering. Polaris is carrying out the DMEA-approved project under profit-sharing operating agreements with Coeur d'Alene Mines, Merger, American Silver, Silver Standard, Rainbow, Callahan Consolidated, and Coeur d'Alene Consolidated mining companies. L. J. Randall is president of Polaris.

At the American Smelting and Refining Company's Morning mine which was shut down permanently in October (See MINING WORLD, November 1953, page 101), a total of 245 men were laid off. Thirty were retained for salvage work and to continue operation of the mill, machine shop, and electric shop for the use of other ASARCO operations in the area. After salvage operations, including mining of the shaft pillar, the mine will be allowed to fill with water and cave in.

The 8,500-foot-long new adit at the *Star* mine, Burke, Idaho, in the Coeur d'Alenes, is scheduled for completion about mid-December at the present rate of progress—800 feet per month. Crews are driving toward each other. Work from the surface is on a three-shift basis; that from the mine on a two-shift basis. The work is being done by *Hecla Mining Company*, of which Ralph Neyman is general manager.

Sunshine Mining Company has upgraded its mill feed by suspending work in some low-grade stopes. The big Coeur d'Alene district silver producer has cut a station for a new No. 8 offset shaft which will be sunk to the 4,000-foot level to facilitate opening of the Polaris and Chester vein systems at greater depths. A 3,400-level south crosscut has cut the Yankee Girl vein in *Metropolitan Mines'* ground and drifting is under way to get under ore shoots stoped on the 3,100 level. Exploratory diamond drilling is being done in the footwall of the Silver Syndicate fault-vein opened recently from Sunshine's 3,700 level.

A hoisting accident caused a week's shutdown at the *Pine Creek* property of *Highland-Surprise Consolidated Mining Company* in Idaho. The mine cage tore out the sheave wheel and the cable pulled the drum off the hoist, causing $4,000 worth of damage. Frank J. Luedke of Spokane is president.

Idaho Mining Company has been advancing three headings on the 300-foot level of its *Moon Creek* property, northeast of Kellogg, Shoshone County, Idaho under a $123,738 DMEA exploration project. Two parallel structures 800 feet apart have been drifted upon for 250 and 375 feet. Both faces show mineralization, mostly galena with silver. A crosscut is being extended into an unexplored area to get under two strong anomalies indicated by surface geophysical work. Bruce Allgaier is secretary-manager. O. E. Haaland, Silverton mining engineer, has been doing the work under contract.

Exploration work is under way at the *Liberty group* of claims near Murray, Idaho. An 800-foot tunnel has been cleaned out, retimbered, and rerailed. Plans call for extending the tunnel about 100 feet to intersect a vein showing lead-silver values at the surface. The property is owned by Richard D. Riegel of Spokane, Washington.

Gem Monazite Mines, Inc. is constructing the first unit of a separation plant at Cascade, Idaho. The unit is on a barge which will be towed astern the dredge to be used in mining operations. More than 30 test holes reportedly have blocked out more than 10,000,000 cubic yards of dredgeable placer material. Ken Jackson is president.

Clarence D. Nelson, Spokane prospector, and seven Spokane associates have organized *Saxon Mining Company* to test commercial possibilities of a radioactive aplite outcropping in the Trail Creek area of Boundary County, east of Naples, Idaho. They will also attempt to find the source of radioactive dump material at the old *Keith* property four miles west of St. Regis, Mineral County, Montana. A tunnel driven 40 years ago at the Keith property is being reopened. Considerable bulldozer stripping has been done at the Trail Creek holdings.

Stockholders of *Princeton, Fortune* and *Eastern Lead* mining companies have approved consolidation of their holdings in the Summit district east of Mullan, Idaho, thus clearing the way for consideration of an exploration offer from a large operat-

ing company. Princeton is issuing 1,000,000 shares of its 10-cent par value stock to each of the other two firms. J. V. Grismer of Wallace is president.

A purchase offer for the patented *Argentine* lode mining claim in the silver belt west of Wallace, Idaho is under consideration by E. M. Flohr of Wallace, court-appointed trustee for owners of the majority interest in the claim. The claim, which yielded some production in the 1890's from shallow workings, is surrounded on three sides by *Vulcan Silver-Lead Corporation* holdings, which are being developed under lease by *American Smelting and Refining Company*.

California interests have organized *Fairfield Mining Company* to test 1,400 acres of placer ground in the Skeleton Creek district of Camas County, 33 miles north of Fairfield, Idaho. Seventy unpatented placer claims, buildings, drilling machinery, and other equipment have been obtained from Arthur E. Uhl and Thomas H. Mellen. A public stock offering is being made to finance drilling of 50 holes to bedrock at an average depth of 60 feet.

Development of a large silica deposit one mile north of Bergdorff, Idaho County, Idaho is the objective of newly organized *Jeanette Creek Mining and Exploration Corporation* of Kellogg. Partners in the venture are Earl Chilcott, and James G. Towle of Kellogg, and Larry E. Duncan of Sweet Home, Oregon. Capitalization is $300,000. The deposit is estimated to contain 1,000,000 tons of silica above ground.

Inspiration Lead Company of Montana, a newly formed subsidiary of *Inspiration Lead Company, Inc.* which operates in Idaho, has taken an option to operate the *Oro* lead-silver-copper-gold mine in the Yaak district near Troy, Montana. The operating agreement is with A. L. Osborn and David Lohoefer of Kellogg, Idaho who have a 99-year lease and purchase option on the 12-claim property. In continuing exploration work started by Osborn, a 900-foot-long vein system was exposed at the surface containing at least three ore shoots. Mining equipment has been installed and a new main adit is being driven at a lower level than original prospecting work. Inspiration Lead will receive 70 percent of profits after mining costs are deducted, plus its original expenditures in developing the property. R. R. Weideman is mining engineer in charge. W. T. Anderson of Spokane, Washington is secretary-manager of the parent firm, which is also exploring the Inspiration Lead prospect near Wallace, Idaho.

The *Water Hole* property 20 miles east of Saltese in Mineral County, Montana reportedly is being explored for uranium by *Coronado Copper & Zinc Company*, a subsidiary of *Cyprus Mines Corporation* of Los Angeles, under a contract with the United States Atomic Energy Commission. A crosscut has been driven more than 100 feet in a drive to get under a promising zone of surface radioactivity.

Coronado Copper & Zinc Company, subsidiary of *Cyprus Mines Corporation* of Los Angeles, has stopped exploration at the *Blue Bird* mine near Rocker, Silver Bow County, Montana, and has closed its Butte office. The company has started development of holdings of *Mineral King Mining Company* near Saltese, Mineral County, Montana. (See MINING WORLD, November 1953, page 108.)

The *Great Northern Railroad Company* has named its railroad siding to the new *Aanaconda Aluminum Company* plant near Kalispell, Montana "Conkelley," in honor of the chairman of the board of directors of the *Anaconda Copper Mining Company*. The siding was formerly known as "Brent." It is reported that the Kelley shaft produced over 11,000 tons of copper ore per day during October.

Following five years' steady production, the *Linton* lead-silver open-pit mine near Bonita in the Cramer Creek area, Missoula County, Montana, has been shut down because of the low lead price and rising operational costs. Mining equipment is to be sold but the property retained. Production was started in 1949 after installation of a sink-float plant and output averaged more than 1,000,000 pounds of lead annually through 1952. Operations were curtailed early this year. Thomas J. Linton, Spokane mining man, and his associates have taken a lease and bond on a large group of placer and lode gold claims at the head of German Gulch, southwest of Butte. More than 60 test pits have been dug with satisfactory results.

DMEA has approved a $21,460 copper exploration project by *Queen Mining Syndicate* in the Philipsburg region of Granite County, Montana. A tunnel rehabilitation and drifting program is to be carried out by the syndicate of W. J. Noon, G. D. Lyon, J. H. Mellen, and William Howell.

Peter Antonioli of Butte was sole bidder for a lease on 398 acres of government-owned phosphate land 15 miles southwest of Butte, Montana. His bid was $938.34.

Boulder Ores, Inc. has been organized for $300,000 by John S. Stohr, Clem J. Meyer, A. W. Berge, Leo J. Kottas, and W. R. Price, all of Helena, Montana.

K & S Corporation has been incorporated for $300,000 by Mastin Taylor of Boulder and Paul W. Smith and J. Miller Smith of Helena, Montana.

Radiation, Inc., with a capitalization $250,000, has been formed by Frank and LaVon Soll and John MacGinnis, all of Basin, Montana.

The *Cornucopia* mine about one mile west of Virginia City, Montana, one of

the few operating gold quartz mines in Montana, has closed down. All equipment is now being removed from the underground workings.

OREGON

The *Sanger* mine, early-day gold producer in Baker County, Oregon, is the site of a small mill installation by William J. Wendt of Baker to test the ore found in several veins which have been under development for the last two summers. Surface prospecting by bulldozer has uncovered at least five promising prospects. One outcrop showing rather high values has been uncovered for a length of about 300 feet. It is expected that operation of the test mill will yield data valuable in arriving at a better understanding of the present day economic picture in connection with the property.

The old *Buffalo* mine in eastern Grant County, Oregon is being operated by Jim Jackson and Bill Coxe under lease from *Boaz Mining Company* of Seattle. Concentrates are being shipped to the Tacoma smelter.

A small chrome concentrator is being built by Burt Hayes on Dog Creek, southeast of John Day, Grant County, Oregon on property leased from Ray Summers of John Day. Hayes shipped first chrome concentrates from the John Day area to the Grants Pass purchasing depot in 1952.

WASHINGTON

Goldfield Consolidated Mines of Reno, Nevada, has stopped mining zinc-lead ore from its *Deep Creek* mine in the Northport district, Stevens County, Washington, and shut down its *Sierra* zinc mill because of continuing low prices for base metals. The firm had suspended operations at its *Anderson* open-pit zinc mine a year ago. The 350-ton capacity mill was one of Washington's largest lead-zinc concentrate producers for the last 3½ years. Development work is being continued at the Deep Creek mine. T. (Cy) Higginbotham is general manager of the Stevens County operations.

Barite is being mined by open-pit methods from the William Madsen farm west of Addy, Stevens County, Washington, by *Manufacturers Mineral Company* of Seattle. A tractor with bucket is used to load trucks for the haul to Chewelah. Several cars have been shipped by railroad to the firm's Seattle processing plant. Extent of the deposit is unknown. It was acquired from E. J. Cowan and M. F. Flannigan of Tacoma. The company employs 12 men in its Chewelah plant, shipping barite, dolomite, silica sand, and marble. G. H. Waterman of Seattle is president.

Ruby Silver Mines, Inc. with a capital $100,000 has been incorporated by H. D. Khont, A. G. Henderson and F. J. Rosenstein, all of Yakima, Washington.

precipitates — SOUTHWEST

FOREIGN METAL COMPETITION DISCUSSED AT EL PASO MINING DAYS CONFERENCE

The International Mining Days, October 28 through November 2, at El Paso, Texas included the regional fall meeting of the AIME as well as the annual meeting of the New Mexico Mining Association.

Felix E. Wormser, assistant secretary for Mineral Resources, Department of Interior, addressed the attendees at the welcoming luncheon. He said, the present problem of the government, in regards to the mining situation, is to ensure a continuing flow of vital minerals which must come from abroad without jeopardizing the position which domestic producers must occupy in a secure and well-balanced economy. He also mentioned that there are deficiencies in our present minerals policy. In his opinion, we do not have well integrated courses of action with respect to minerals and metals because traditionally the general public has taken these materials pretty much for granted. We have been too much inclined to live upon our reputation as a country endowed by nature with unlimited natural resources, says Mr. Wormser. We have worried about them in critical times only. Strategic stockpiles are absolutely necessary, but he continued, the best stockpile is a going-concern domestic mining industry.

Andrew Fletcher, president of the AIME, and St. Joseph Lead Company, told a general luncheon gathering that the United States is not a "Have-Not" nation, unless it is turned into one. The average cost per pound of metals produced in the United States is, and seems destined to continue to be, higher than the cost of foreign produced metals. This higher cost Mr. Fletcher attributes to our higher standard of living—and he feels that we should have no regrets that it is so. Necessary ore reserves can only be found by prosperous companies which have the necessary millions to spend on exploration. The question for our nation to decide, says Mr. Fletcher, is, do we, or don't we want a prosperous domestic mining industry and so be in a position to "create" our own needed raw materials.

Of the five major plans presented to remedy the present lead-zinc situation, Mr. Fletcher favors the Sliding Scale Tax or Tariff. It would give our mining industry protection only when it needed it and would still be fair to our foreign friends.

The New Mexico Mining Association approved a resolution urging that imports of potash should not be permitted from foreign producing nations which do not permit equal entry of United States potash into their countries. Many such nations now have complete embargoes.

The resolution on potash followed an address on the New Mexico potash industry by F. O. Davis, vice president and treasurer of Potash Company of America, Carlsbad. He pointed out that Russian potash has been sold in the United States at prices below those in Europe. Foreign importers have taken advantage of conditions in this country, he said. Russian potash was imported when the Carlsbad mines were shut down by a strike in 1949 and 1950.

Mr. Davis also recalled that the United States government used American tax money to finance rehabilitation and expansion of the potash mines and refineries in Europe after World War II. Now those plants are competing with American industry in the domestic as well as the world market.

GSA Signs 3-Year Copper Contract With Riviera Co.

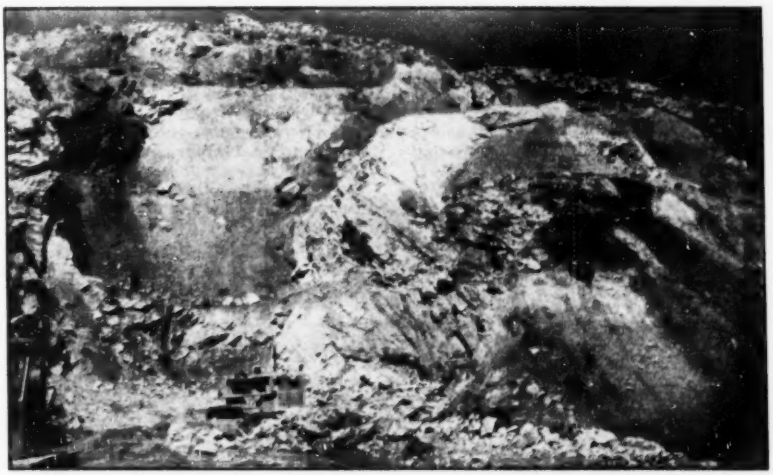
A three-year contract covering 3,000,000 pounds of refined copper has been signed by the Riviera Mines Company of Phoenix, Arizona, and the General Services Administration. The government will pay Riviera 32 cents a pound for the copper, less differentials.

Riviera Mines is a recently formed company headed by W. L. Allison, president of Allison Steel Company, also of Phoenix. It has acquired the Christmas mine in the Banner mining district of Gila County, near Winkelman, Arizona, previously operated by the Sam Knight Mining Lease, Inc.

In March 1952, the government signed an agreement with the latter firm for production from the Christmas mine, the contract covering 2,390,000 pounds of copper at a price of 31.6 cents per pound. The Knight contract terminated automatically when price controls were removed from copper in February 1953. At that time over 1,150,000 pounds had been produced.

The new contract calls for production of 600,000 pounds of refined copper this year, and 1,200,000 pounds in each of the next two years. The contract ends automatically on December 31, 1955, or earlier if full production has been achieved.

Work has been suspended at the *Abril* mine, near Tombstone, Arizona, with the completion of the DMEA project. This work, it is said, failed to uncover any new ore deposits and the low price of zinc has made it impossible to produce from known ore reserves. The Abril has



U. S. VANADIUM'S RILEY TUNGSTEN MINE

An important source of tungsten ore in the United States, the Riley mine of United States Vanadium Company located about 15 miles northwest of Golconda, Nevada, is shown above. Here a Caterpillar Diesel D8, with angling blade, is stripping overburden from a vein of tungsten, and removing waste to the dump. The bulldozer is also used to build and maintain roads, and for clearing snow. The ore is transported to the nearby Getchell Mine, Inc. for custom milling. Concentrate then goes to United States Vanadium's operation at Bishop, California, where it is further processed into synthetic scheelite. Two shifts are in operation at the Riley mine, employing 55 men. There are about 2,000 feet of underground mine workings. Open-pit mining is done where ore is close to the surface. The mine was closed in December 1947 but reopened again last year.

SOUTHWEST PRECIPITATES

been operated since 1951 by Sherwood B. Owens of Tucson, under lease from *Shattuck Denn Mining Corporation*. During most of 1951 and early 1952, Owens shipped from 400 to 600 tons of copper-zinc ore monthly from the Abril.

By Mid-October, shipments from the *Volcano* mine in the Harshaw district of Arizona, were said to have totaled 35 carloads. The average of all shipments was reported as 7.90 percent copper, with the best shipment assaying 9.78 percent copper. The ore is sent to the *American Smelting and Refining Company's* El Paso copper smelter. In October, an adit was started on the hillside some distance below the shaft from which recent ore shipments have been stoped. This adit is to be driven toward the present shaft, and will be about 120 feet below the elevation of the collar of the present shaft. About 250 feet of drifting will be required. Five men are employed in driving the adit. The Volcano—sometimes called the *Sunnyside*—is owned by the *Santa Cruz Copper Company*. The main stockholders of this latter company are Lee Farrell, Patagonia, Arizona, who is in charge of the present work, and the *United Minerals Corporation* of Salt Lake City, Utah, George W. Snyder, Jr., president. Recent work at the Volcano is at the site of an old open cut worked many years ago. A vertical shaft, 8 feet by 12 feet, was sunk to a depth of 50 feet. At that level the shaft was turned to 63° incline, following the ore formation, and ore was stoped from the inclined part of the shaft. Production has been suspended pending completion of the new adit.

About 1,000 tons of copper ore are being produced monthly by the *Bonanza* mine located in the Duquesne district of Santa Cruz County, Arizona. The mine, owned by *Nash Mines, Inc.*, is leased and operated by Carl S. Elayer of Silver City, New Mexico, doing business as *Elayer and Company*. Ore shipments are sent to the El Paso smelter of *American Smelting and Refining Company* and are said to have averaged about 10 percent copper per ton, with a small amount of silver and very little lead and zinc.

The *Holland* mine, leased and operated by E. W. McFarland of Nogales, Arizona, is expected to close down shortly because of the low price of zinc. McFarland has been shipping from 200 to 250 tons of ore per month for the last three months, the ore said to assay from 10 to 12 percent zinc, 5 to 6 percent lead, 8 ounces silver, and 1 percent copper, all in sulphide ores. The ore is trucked to the Trench mill of American Smelting and Refining Company for milling.

Paul L. Hunter of Patagonia, Arizona, has leased the *Maine* mine in the Duquesne mining district of Santa Cruz County, and is dewatering an 80-foot winze below the 300-foot adit. The Maine is owned by *Nash Mines, Inc.*, but has been idle for the past year. Mr. Hunter had been leasing and working the *Silver Bill* mine, also owned by Nash Mines, but discontinued mining operations in October because of the low price of lead and zinc. The ore which had been shipped to ASARCO's Trench mill is said to have averaged about 7 percent zinc, 4.5 percent lead, and 4.5 ounces silver per ton.

Lester Fernstrom of Arivaca, Arizona is making plans to increase the capacity of his tungsten mill to about 40 tons per day. The plant, constructed last summer, has a capacity of one ton per hour and is located three-quarters of a mile west of Arivaca. Fernstrom also is reported to be planning to expand his operations at the *Les Jimfre* mine in the Baboquivari Mountains.

The *White and Powers Mining Company* of Arivaca, Arizona has completed its mill, three miles southwest of Arivaca, and is running the plant one shift daily, milling from 12 to 15 tons of old tailings. The first shipment—10 tons of concentrate—has been trucked to the El Paso smelter of the *American Smelting and Refining Company*. Work at the *Loleta* mine, under lease to the W&P company, has been temporarily discontinued. Frank Parker of Arivaca is superintendent.

The *Tyone Mining Company* of Tyler, Texas is actively exploring the *Tyone* mine, located about one mile north of Paradise, Arizona. Work so far consists of one shaft (42 feet deep), four open cuts and six trenches. The Tyone is a tungsten property, the ore occurring in the form of scheelite. Operators estimate a probable average grade of 1.0 percent and claim the ore is amenable to dry-table concentration. A pilot mill is being erected.

Kennecott Copper Corporation, Ray Mines Division, at Ray, Arizona has ordered 18 custom-built dwellings for its mining town of Sonora, Arizona. The houses will replace homes that must be abandoned because of the expanding open-pit mining operations. The houses will be built by *Mobilhome Corporation* at its Phoenix plant and delivered by special truck to Sonora. Estimated cost of the houses is $105,000.

American Smelting and Refining Company expects to start actual mining of copper ore next February at its *Silver Bell* unit, northwest of Tucson, Arizona. According to T. A. Snedden, southwestern manager, normal mining operations will call for a crew of about 250 men. During the peak of development and construction, employment has reached 500. Construction of the 7,500-ton per day flotation plant is well advanced, and removal of overburden is proceeding at the rate of 1,000,000 tons a month. Development of the Silver Bell unit was made possible by a government floor price contract under which the government may purchase up to 177,000,000 pounds of the first 197,000,000 pounds of copper produced at a price of 24.5¢ a pound. D. R. Purvis is mine superintendent.

Phelps Dodge Corporation has announced the sale of certain properties of the corporation at Clarkdale, Arizona, to W. L. Allison, president of *Allison Steel Manufacturing Company*, Phoenix, Arizona. In announcing the sale, Charles R. Kuzell, general manager, said in part: "Since the suspension of mining in June this year, Phelps Dodge Corporation has given careful consideration to the disposition to be made of the Clarkdale properties. These properties included the smelter and adjacent lands on the west side of the Verde River, the Clarkdale townsite with its residences, business area and domestic water system, and the domestic water system at Jerome. . . . It was decided to dispose of the properties to a purchaser who would be interested in economic development of the Verde Valley, and, perhaps, the introduction of some manufacturing or industrial activity. . . . It is believed that Allison's acquisition of the Clarkdale properties will stimulate interest in the opportunities for residential and industrial development which the natural advantages of the region and the existing facilities afford." The Phelps Dodge smelter at Clarkdale was closed in June of 1950, and the mine at Jerome in June of this year.

CALIFORNIA

A 40-foot headframe has been erected on the *Mt. Diablo* quicksilver property in Contra Costa County, California, which Ronnie Smith is exploring under a $73,571 DMEA contract. The government's share is $55,178.25. A 50-horsepower hoist has also been installed. A new 330-foot shaft is being sunk with the collar at 900-foot elevation. A 125-foot crosscut will be driven from the shaft to the ore zone where 500 feet of drifting will be carried on. Shaft sinking is scheduled to be completed by the end of this year, and drifting and crosscutting are to be completed in April 1954. Guy A. Castle and Melvin Bruner of Angel's Camp are doing the work under contract. The *Bradley Mining Company* produced large amounts of quicksilver from the mine during the war.

The *Glidden Company* is reported to have received a DMEA contract for underground exploration of its *Bully Hill* copper and zinc mine located on the Squaw Creek arm of Shasta Lake in Shasta County, California. Initial diamond drilling has shown evidence of copper deposits. With the aid of government funds, the firm has been exploring the property since December 1951.

Residents of the Palos Verdes area south of Los Angeles, California have protested the proposed open-pit mining of diatomaceous earth planned by the *Great Lakes Carbon Corporation*. The residents protest the operation as extremely harmful to the health of the people in the district. Great Lakes Carbon maintains that it plans to wet down the dust to keep it out of the air, and to screen the operation from public view.

NEVADA

Newmont Mining Corporation has taken legal steps to foreclose two mortgages of the *Goldfield Deep Mines Company*. One mortgage covers the *Florence* and *Red King* lode claims, while the other covers the *White Horse* and *Fraction* claims. Also included are "all constructions, improvements, machinery, and equipment in or upon said mining claims." Between 1947 and 1949, Newmont had loaned Deep Mines $30,000 to help finance a development program. A 100-ton mill was built and a large crew employed to develop a strike made on Deep Mines ground. The ore body did not prove as extensive or valuable as had been hoped.

A recently incorporated firm, *Midnight Tungsten Mines, Inc.*, is reported to be moving equipment to a tungsten property six miles west of *Kaiser Aluminum & Chemical Corporation's Kaiser* fluorspar mine in Churchill County, Nevada. The firm has taken the property over under option purchase from Mark Harris of Fallon, and Fred T. Pine and William W. Brown of Las Vegas.

Sunshine Mining Company of Kellogg, Idaho is continuing its development of the *Mohawk* mine, 28 miles southwest of Silver Peak, Nevada. Drifts are being extended north and south on the 500-foot level in an attempt to further develop the ore shoot already developed on the 218-foot, or adit, level. South of the shaft, on the adit level, the main ore shoot is about 300 feet long, 215 feet of which is said to have averaged 22 feet in width of 43-ounce silver ore. North of the shaft, another ore body was opened on the same level. The vein was not as wide but was good grade. Future of the mine depends upon developments on the 500 level.

Tonopah Development Company's quest for ore in depth in the *Summit King* mine north of Tonopah, Nevada, finally was successful when a 4-foot-wide vein was crosscut at the 550-foot level. Development work was delayed for a short time while a larger ventilation line was installed, but drifting has advanced about 20 feet on the vein with the ore continuing to show the same characteristics as on the 300-foot level. The company may move its office from Fallon to Tonopah next spring, and original plans to sink a new shaft and build a treatment plant will probably be put into effect when development work has progressed sufficiently.

Newmont Exploration Ltd. has closed its major lead exploration program near Hamilton, White Pine County, Nevada, according to Pete Loncar, mine superintendent. The mine may be reopened in 1954, however.

Eureka Corporation is reported to have encountered an ore body while diamond drilling in the *Adams Hill* section of its property at Eureka, Nevada. The ore lies about a mile north of the Fad shaft and was located at a depth of about 900 feet which is above the horizon where the Fad shaft operations encountered large inflows of water. Lead, zinc, gold, and silver occur over thicknesses of 12 to 15 feet. *Ventures, Ltd.* is a principal stockholder in Eureka.

This year's mapping of the iron ore district of Pershing County, Nevada by the United States Geological Survey has been completed by Charles L. Pitt, cartographer. The territory included covers 450 square miles and is known as Lovelock No. 1 and No. 4. Included on the maps are trails, creeks, dry lakes, houses, mines, bench marks, level lines, and sections. Final publication will not take place for 18 months to two years.

Nevada Uranium Company is installing electrical pumping equipment at its mine

about 50 miles southwest of Winnemucca, Nevada, in Rocky Canyon. A 15-kw. generator and 10-horsepower centrifugal pump are being installed to try to overcome the flooding condition in the mine which has brought development work to a halt. Sinking and crosscutting have been going on under an $8,230.50 DMEA loan; total cost of the project is estimated at $9,145.

Combined Metals Reduction Company curtailed zinc mining operations at its *Castleton* mine in Nevada because of the low price of zinc. 75 men were laid off in the closing. Work will continue on mining of lead-silver ores and on milling of the large manganese ore stockpile. A second shift is being added to the company's *Black Metal* and *Hurley* manganese operations, and production crews will also be added to the *Minerva* tungsten mine 70 miles northwest of Pioche as soon as surface and camp work is completed. These other operations have enabled some of the Castleton employees to be transferred, thereby limiting the number of unemployed.

The *Marshall Mining Company* is operating its *Marshall* or *Delano* copper mine in northern Elko County, Nevada. About 30 tons daily are reportedly shipped to the smelter at Garfield, Utah. In the same county, *Golden Ensign Mining Company* is operating the *Company* mine. General development work has indicated some promising gold and silver ore on the property.

NEW MEXICO

Uranium mining is being carried out in the *Black Diamond* and *Yellow Jacket* mines operated by the *Foutz Mining Company* just east of Kit Carson Cave, near Gallup, New Mexico. Bert Foutz and his sons, Murray B., Reynold L., Reid B., and Allen B. Foutz, form the company. They are also mining in Canyoncito, west of Albuquerque.

Only two mining companies are still in operation in the Silver City, New Mexico mining area. *Kennecott Copper Corporation* is producing copper at Santa Rita and Hurley, while *Luck Mining & Construction Company* is producing an iron-manganese ore at its *Boston Hill* mine near Silver City.

Geobotanical methods of prospecting in uranium-bearing areas of McKinley County near Grants, New Mexico have been investigated by the United States Geological Survey. The geobotanical technique is based on the observation that certain plants grow more prolifically around mines and mine dumps or exhibit certain typical reactions to specific minerals. On behalf of the United States Atomic Energy Commission, Helen Cannon has made this study published as "Geobotanical Reconnaissance" near Grants, New Mexico. In the course of her work she determined that the uranium analysis of trees growing on the Todilto bench and the mapping of selenium-indicator plants on the sandstones of the Morrison formation could be recommended as a method of prospecting. Free copies of the study may be obtained from the Geological Survey, Washington 25, D. C.

Kerr-McGee Starts Uranium Operations In Wyoming

The Navajo Uranium Division of Kerr-McGee Oil Industries, Inc. has started uranium mining in the Pumpkin Buttes area of Campbell County, Wyoming, according to C. M. Van Zant, business manager. First operations consist of stripping two surface deposits.

Navajo has recently negotiated with the United States Atomic Energy Commission to build and operate a uranium mill at Shiprock, New Mexico. See MINING WORLD, October 1953, page 118. This is the firm's first uranium mining in Wyoming and it also has geologists checking the new uranium district further west in Fremont County. W. T. Davis is geologist with headquarters in Gillette, Wyoming.

Deadline Approaches for Validating Claims

In order to fall under mineral leasing laws even though claims are on land included within a prior lease, owners of such uranium mining claims on the Colorado Plateau have until the second week in December to post an amended notice of location of mining claims, stating that such notice is filed in accordance with provisions of this Public Law (No. 250) and file for record such notice in the office where the certificate or notice of location of such claim is recorded. The law applies to claims located subsequent to July 31, 1939 and prior to January 1, 1953.

Claim holders who located their claims during this period should find out if their claims are located on a prior mineral lease or application for lease so that they may take advantage of rights established by Law 250. The Grand Junction Operations Office of the United States Atomic Energy Commission will discuss any questions regarding claims with claim holders.

Monogram Mesa between Joe Dandy and Bull Canyons in Montrose County, Colorado will be the site of diamond drilling to be conducted by the *Mott Drilling Company*. Ten drills will be used for the job.

Hegwer Drilling Company of Rangely, Colorado recently bought the wagon drill owned by the *Conrow Drilling Company* and is prospect drilling in the Meeker, Colorado area for uranium.

Rico Argentine Mining Company reports the following figures for milling of ore from its *Mountain Springs, Silver Swan* and *Argentine* mines during the first six months of 1953. Dry tons of lead concentrate amounted to 1,222.221 with a total content of 23.83 ounces of gold, 44,437.03 ounces of silver, 1,757-216.32 pounds of lead, 94,352.32 pounds of zinc, and 16,727.84 pounds of copper. Dry tons of zinc concentrate totalling 2,173.3124 had a total content of 20.34 ounces of gold, 7,961.85 ounces silver, 141,807.43 pounds of lead, 2,411,803.36 pounds of zinc and no copper. Development work for the first six months of the year included 719 feet of drifts and crosscuts and 35 feet of raises rehabilitating 400 feet of tunnel, and drilling 3,414 feet of diamond drill holes.

San Juan Leasing Company has purchased a new mucking machine which will be used in the company's uranium mines in the Egnar district, San Miguel County, Colorado.

A vein, six to eight feet wide showing lead-zinc-copper sulphides has been cut in the exploration crosscut in the *Shenandoah-Dives Mining Company's* mine at Silverton, San Juan County, Colorado. The company's exploration program has included crosscutting to the Letter G. Vein which is expected to be reached shortly. The vein which was cut, thought by some to be the New York, is the only vein of consequence cut thus far in over 500 feet of crosscutting.

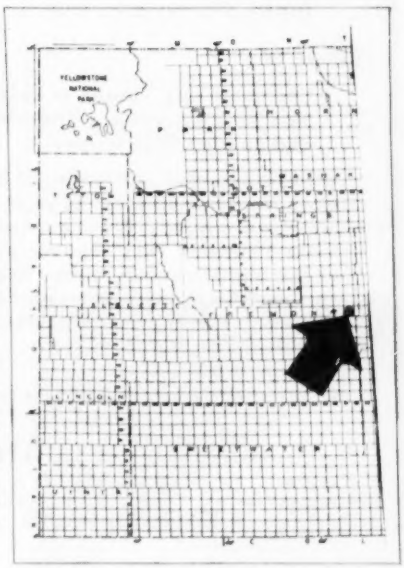
The strike of the *International Union of Mine, Mill and Smelter Workers* at the *New Jersey Zinc Company's* Gilman, Colorado operations has been ended after over two months with an interim settlement agreement. W. L. Jude, superintendent of the Gilman operations said the employees will return to work as soon as the plant resumes production. A portion of the incentive contract for some of the underground workers will be altered. Colorado operations of New Jersey Zinc are the *Empire Zinc Division*.

A 43-page report on the Robinson and Weatherly uraniferous pyrobitumen deposits near Placerville, San Miguel County, Colorado is on file for public use at the United States Geological Survey Inquiries Office, Room 468, New Customhouse, Denver, Colorado, and at the United States Geological Survey, Grand Junction, Colorado. The illustrated report is one of many maps and reports on the geology of various parts of the United States which the United States Geological Survey has released to open files.

Homestake Mining Company of Lead, South Dakota, has announced plans for ore development below the 5,000-foot level. In order to carry out these plans, the Yates shaft must be deepened from the present bottom at 4,250 feet. Present development is being done through the No. 3 winze. A pilot raise from the 4,850 drift will be driven to the Yates shaft bottom. After the shaft has been enlarged to the 4,850 level, sinking will begin. After installation of a skip pocket below the 4,850 at the Yates has been completed, a new underground shaft will be started. The completion of the Yates shaft to the 5,000-foot level and other necessary initial development will require

NEW URANIUM DISCOVERY IN WYOMING

The arrow on the adjoining map (western half of Wyoming) points to the location of the latest uranium discovery. It is in Section 22, Township 33 North, Range 90 West on the remote plains of Fremont County, east of Lander. Surface indications have already been traced about 17 miles. Neil McNeic, a Wyoming prospector, is credited with the discovery. Charles C. Towle, chief of the Denver exploration branch of the U. S. Atomic Energy Commission, reports that, on the basis of the first tests, the ore (carnotite) will be of commercial value. The AEC will not make public assay reports. Along with AEC geologists, Kerr-McGee Oil Industries, Inc. of Oklahoma City is investigating the area. Radiometric reconnaissance flights over the area are being made by Jenkins & Hand of Casper, Wyoming. Initial studies indicate that all of the land is within the public domain, although there may be oil and gas leases covering some of the area. Prospectors can stake uranium claims for areas 1,500 by 600 feet and must excavate discovery pits, 10 feet square and 10 feet deep within 90 days from the time they record their claims.



an expenditure of about $500,000 and will take approximately a year to complete.

Discovery of radioactive rock, possibly uranium bearing, has been reported between the South Dakota and Wyoming border, near Belle Fourche, South Dakota. Negotiations for leases and exploratory drilling rights are being made in the area. Some samples of the ore have been collected by engineers from the *Homestake Mining Company* at Lead, South Dakota.

Minerals Engineering Company of Grand Junction, Colorado has been awarded a contract to diamond drill a maximum of 50,000 feet near Edgemont, South Dakota. Four drills will be assigned to the job which will be done for the United States Atomic Energy Commission.

UTAH

The *United States Vanadium Company* has awarded a uranium diamond drilling contract to the *Johnson and Youvon Drilling Company* of Naturita, Colorado, on the Colorado Plateau of Colorado and Utah. Surface drilling is now under way south of La Sal, Utah, and four miles west of the Colorado-Utah state line on La Sal Creek. John W. Hill, manager of mines, is directing U. S. Vanadium's mining operations. Mr. Hill maintains offices in Grand Junction, Colorado.

Mammoth Mining Company of Mammoth, Utah has shipped four cars of copper-gold ore to the Garfield, Utah smelter of the *American Smelting and Refining Company* for the first time in nine years. E. Steel McIntyre, president and general manager of the Mammoth firm, reports that mining is being done at the 400-foot level with a crew of 10 to 15 men.

New mining developments reported from the *Utex Exploration Company, Inc.'s* Moab, Utah offices are reported as follows: Recent core drilling on the *Te Quiero* claim cut 25 feet of ore averaging 0.69 percent U_3O_8 with 15 consecutive feet assaying better than 1.00 percent. This discovery enlarges the area of the known deposit of rich ore on Utex property in the Big Indian area near Moab. Utex has announced preliminary plans to build a motel and a housing project on a 160-acre tract east of Moab. Houses will be sold or rented to employes of the firm. Expenditure for the motel, being designed by Fetzer and Fetzer of Salt Lake City, Utah, will be between $200,000 and $500,000. A recently released United States Bureau of Mines report prepared by Charles A. Steen, Utex chief geologist, George P. Dix, Jr., Utex field geologist, Scott W. Hazen, Jr., and Russell R. McLellan, bureau mining engineers, discusses the development of the Utex property.

Western Gold and Uranium Company is shipping an average of 75 tons a month of uranium ore from its *Silver Reef* mine west of Leeds, in Washington County, Utah. The company has a wagon drill prospecting in the area and has drilled more than 120 holes. Over 25 percent of the holes reportedly indicate presence of uranium ore of milling grade.

Kennametal

(*Continued from page* 55)

line was laid so that pump capacity for each stage balanced head and line loss.

Since it was necessary to construct larger camp facilities, a large addition was made to the boarding house. Butane is used for cooking and heating water and walk-in and three-door ice boxes hold most of the perishables. A new three-room office has been constructed along with four 12-man bunk houses, six family apartments and one new home. The latest addition is a nine-room staff house having a reserved guest room. Fourteen families are accommodated in the apartments and houses.

Extensive Testing Facilities

A complete assay and testing laboratory is provided, with two men usually operating the assay department. The mill superintendent along with a metallurgist run tests to determine if any extraction improvement may be secured by using newly-developed reagents. The assay office has three rooms, one of which contains a jaw crusher, Braun disk pulverizer, bucking board, screens and sample splitters. Compressed air is available to clean equipment and an exhaust fan helps to keep the dust down. The main room is complete with gas plates and drying oven, scales, balances, etc. A Fisher mechanical grinder with a Kennametal cemented tungsten carbide mortar and pestle help take drudgery out of sample preparation for gravametric determinations. Both Cinchonine and Nemadine are used in these determinations. This method is used only on high-grade products. A Klett-Summerson test tube photoelectric colorimeter is used for accurate determination of samples of under 2.0 percent WO_3. All mill, mine, diamond drill core and sludge samples are run by this method; it's quick and the assay determination may be finished in a day. A Le Chatelier specific gravity bottle with coal oil as the liquid is used to determine the tungsten content in flotation and table concentrates. A high degree of accuracy has been developed in determining the correct percentage table to use with each product. During the month of November 1952 results indicated an error of only 1.33 percent for the total production from tables. A dark room has been provided so samples may be studied under both ultra-violet light and the microscope.

FM Communication

No means of communication except driving 50 miles to town was provided under the old ownership. Telephone service was out of the question due to distance. Tests were conducted and a General Electric FM communication system installed. Due to high mountains between the station at Fallon and the mine it was necessary to run a line from the mine office to the top of a ridge three-fourths of a mile distant to get a good point of reception. This service has saved the company much money and many man-hours. A set is also provided for use in mobile equipment traversing the road between mine and town.

Kennametal Inc. has also built a tungsten refinery located at Port Coquitlam, British Columbia. This new plant located 17 miles east of Vancouver, refines tungsten concentrate and makes tungsten carbide. It assures Kennametal's Canadian customers an ample supply of a very desirable industrial product. These two latest additions have been made without the use of any government money and show what may be accomplished under an intelligent type of progressive management.

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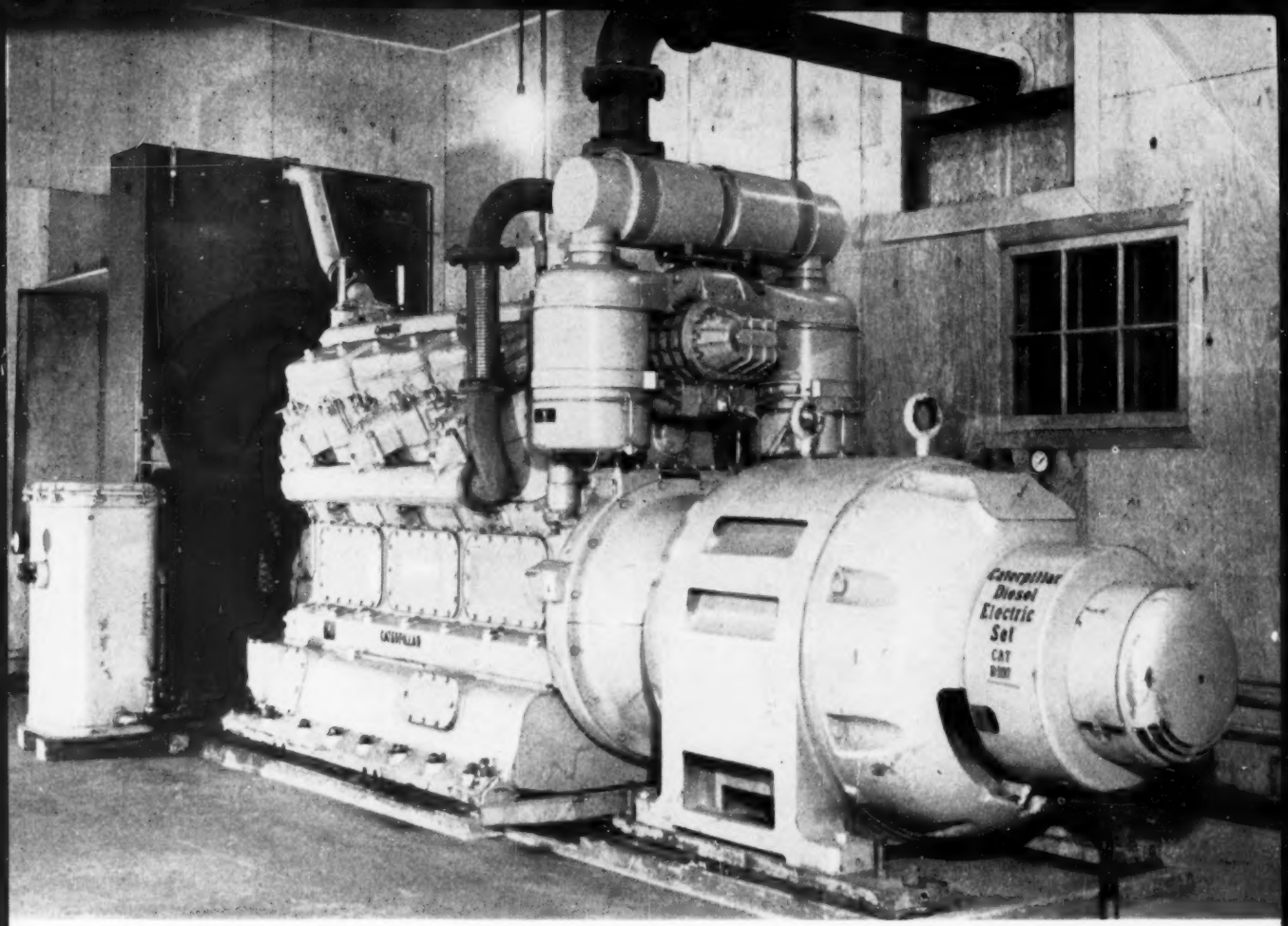

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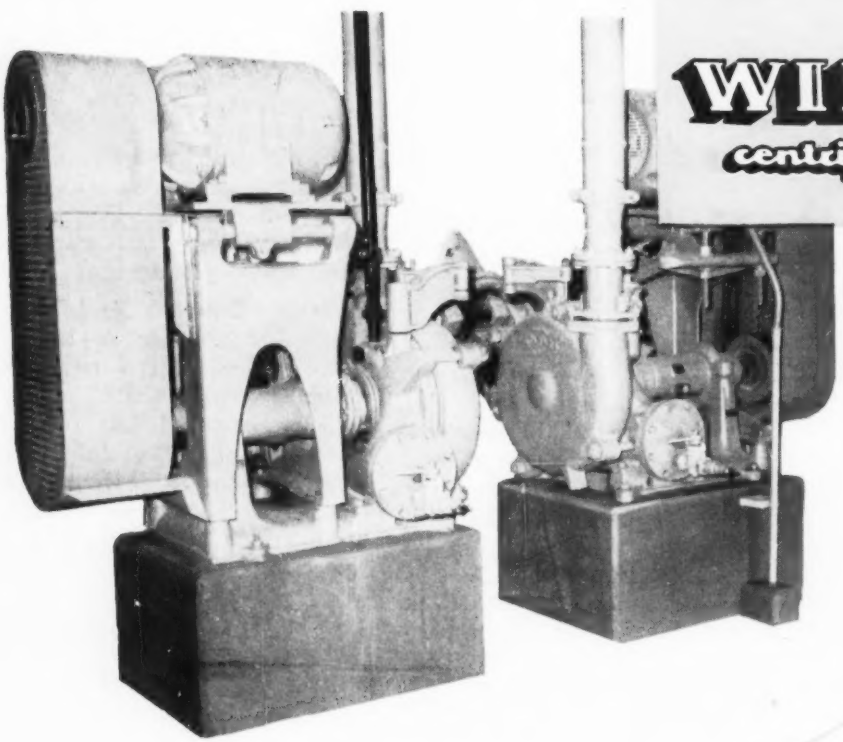

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